Bio Optica Milano S.p.A. • via San Faustino 58 • I-20134 Milano
Tel. +39 02.21.27.13.1 • Fax Acquisti/Export +39 02.21.54.155
Fax Assistenza/Contabilità +39 02.26.41.74.48 • Fax Vendite +39 02.21.53.000

BIO-OPTICA - VTP300 HISTOLOGY VACUUM TISSUE PROCESSOR USER MANUAL

INDEX

General warnings

Before using the instrument, please carefully read this manual.

Please pay particular attention to the precautions that must be taken for user and product safety.

To avoid potential instrument damage, do not use reagents different from those specified in this manual.

The warranty applies only if the instrument is used in the correct manner and in accordance with the information and advice provided herein.

The manufacturer declines all responsibility for possible damages to persons and/or objects due to improper or inexperienced use of the instrument.

Designated use

This instrument has been designed to be solely used in a Histology laboratory, by on purpose trained technicians, for processing specimen, provided that is used accordingly with the instructions contained in this manual.

The VTP300 is a tissue processor designed for the following laboratory applications:
- **fixation**
- **dehydration**
- **paraffin wax infiltration of histological tissue samples.**

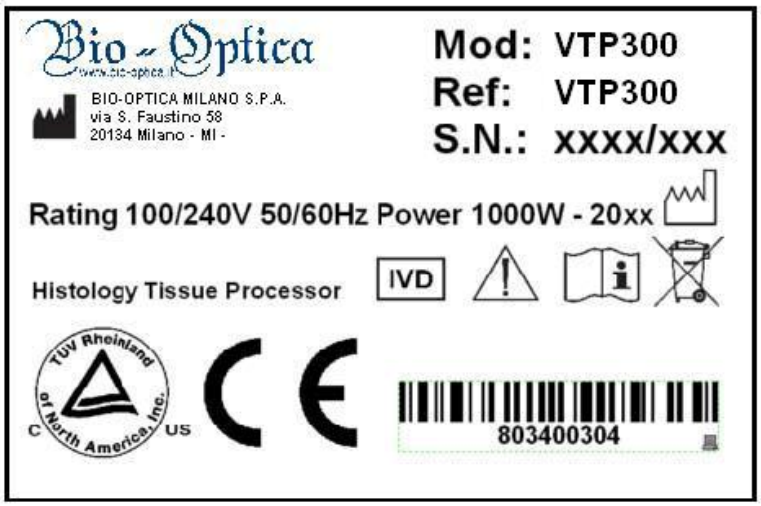
Any other usage is expressly prohibited.

Failure to follow to these instructions may result in accidents, damages to the instrument and accessory equipment, personal injury.

Instrument type and instrument identification

The information provided in this manual applies only to the instrument indicated on the front page of this manual. The instrument is clearly identified by a label applied on the rear of its body.

Identification label sample:



Identification label symbols:

2007	Year of manufacturing
Rating	It indicates the various voltages at which the instrument can work (by varying the connection in the internal transformer) **another label, in the proximity of the main power cable socket, indicates the voltage at which the instrument is connected and at which it must work.**
	Manufacturer address.
CE	CE mark.
IVD	In Vitro Diagnostic Device.
	Caution! Please read accompanying documentation.
	Please read the instructions for the use.
	Do not throw on domestic garbage, please follow the local rules for special waste recycling and treatment.
	CTUVus TUV Reinland of North America – Conformity to United States and Canada safety prescriptions and standards.

Safety precautions

- **Severe damage can result if the instrument is connected to a power supply different from the rating stated in the identification tag placed on the rear of the instrument.**
- **The instrument must NEVER be used without being connected to an appropriate and fully efficient ground connection.**
- **If damages due to transport occur, DO NOT use and DO NOT connect the instrument to a power source. Contact our technical service.**
- **This instrument has been designed to work 24/7; for this reason and for operative precautions, the power switch is placed on the rear of the instrument.**
- **Access to the instrument's internal components is reserved only to specialists trained in the service of the instrument.**
- **Always disconnect the processor from the electrical main source before accessing the electronics and internal parts.**
- **BEFORE replacing fuses, disconnect the instrument from the power source.**
- **Always make certain to correctly engage the reagent bottles.**
- **DO NOT open the processing chamber lid when the instrument is working without following the instructions contained in this manual.**
- **Use specific precautions in handling flammable reagents such as ethanol (wear protective gloves and eyeglasses).**
- **Use specific precautions in handling liquid waxes as they can cause burns.**
- **The emptying and filling of reagent bottles must only be done only by qualified technicians.**
- **Due to the presence of flammable substances inside reagents bottles, it is recommended to:**
  - **Avoid smoking near the instrument.**
  - **Avoid using open flames near the instrument (e.g. Bunsen burner).**
  - **DO NOT wear clothes that can create electrostatic charges while handling reagents (wool, synthetic fibres, etc.).**
- **Contaminated reagent waste must be disposed off in accordance with all applicable local laws, ordinances and safety standards.**
- **Use only original spare parts supplied by the manufacturer or by authorized dealers.**
- **DO NOT extract bottles, replace reagents or do other maintenance operations when the instrument is operating.**
- *To complete the knowledge on the instrument safety please read also the chapter SAFETY DEVICES near the end pages of this manual.*

Unpacking, transporting and handling

Before moving or transporting the instrument, it is essential to carefully read this chapter, paying particular attention to the instrument setup instructions.
The warranty is invalid if the instrument is improperly operated. Be certain to follow the instructions and recommendations provided by this manual. The manufacturer is not responsible for damages resulting from improper operation or handling of the instrument.
Pay particular attention to the outside of the shipping container. In the event of concealed damage, save all shipping crates and packing material. DO NOT unpack the instrument if damage is apparent. Immediately notify the carrier of any damage and contact the shipper to initiate any claims.

Unpacking

The proper steps to be taken are:
1) Open the top of the box.
2) Lift the side walls out of the way.
3) Raise the instrument to the vertical position.
4) Remove the plastic layers that wrap the instrument.
5) Carefully check the external condition of the instrument. In the event of evident damage, DO NOT connect the instrument. Immediately notify the carrier and promptly contact the seller.
6) **For the setup of the instrument, see the specific chapter (Installation and Start-up) in this manual.**
7) Save the box and all the internal packaging in the event that the unit requires future shipment.

Packaging and/or preparation for transport

To transport the instrument, perform the following steps:
1) Remove all reagents (waxes included) from their bottles.
2) **Remove and close, with the proper threaded cap, the charcoal filter bottles, put also some adhesive tape on the air inlet to avoid charcoal pellets to get out.**
3) Transport the charcoal filter bottles separately from the instrument, wrapped and securely closed in a protective nylon bag.
4) If the original box has been saved, follow the unpacking instructions in the reverse order, using all the interior packaging to avoid serious damage to the instrument during shipping.

Transportation

Before shipping, please keep in mind that:
1) The instrument is fragile.
2) The instrument is equipped with electronic parts.
3) Contact with water and/or any other liquid is to be avoided; please ensure that the internal plastic protection bag that wraps the instrument is utilized.
4) Transporting and storing temperature(s) must be between -10°C +50°C.
5) Using the original box, the instrument is to be transported horizontally.
6) Transporting the instrument vertically is highly discouraged as its centre of gravity is quite high.

Introduction to the VTP300 Processor

General features

The VTP300 tissue processor recycles the air utilized to move the reagents to and from the processing chamber. Two effective charcoal filters on the external air-intake reduce the exhaust fumes to acceptable and safe levels.
The wax and reagent bottles can be rapidly removed and easily reinstalled in their housing slots.
The control devices (hardware and software) are based on the most up-to-date processing control technologies.
Up to 12 different programs can be permanently stored and be easily modified. The 12th program is a special "REVERSED" program that is used to de-process samples that have not had good infiltration.
During a run, every step and action is displayed on the screen, such as current step and function (emptying, filling, etc.), processing chamber and wax heating chamber temperatures, processing chamber pressure, completion time and date, and any other parameter necessary to simplify the use of the instrument.
In the event of power failures, the computer saves all the data necessary to restart the process exactly where it was interrupted. If the interruption happens during the wax stages, particular precautions are taken to guarantee melting before any wax filling or emptying begins.

User interface and keyboard

The user interface is based on "Touch Screen" technology. Therefore there isn't any traditional keyboard; all the instrument functions are activated by a finger touch.
At the bottom of the screen there is a window, with a green background colour, used for messages to the operator. Those messages inform and guide the operator about actions that can or must be taken to safely operate the instrument.

In the upper left side of the screen there is an icon with the letter "i" inside, by pressing on it a window will appear showing the most important parameters and settings of the instrument:

- SPC - Sample Processing Chamber Pressure.
- SPC - Sample Processing Chamber Temperature.
- WAX - Wax chamber Temperature.
- RMS - RMS (Reagent Management System) status (enabled or disabled).
- RMS reagents – Status of reagents maintenance: OK = RMS executed, NEEDED = RMS not executed or not completely executed. OFF = RMS disabled.
- EWD - Device not active on VTP300 model.
- WCC - Wax Cleaning System status (ON = active, OFF = not active).
- UPS - Uninterruptible Power Source status.
- UPS battery - Battery pack of the UPS charge.
- Charcoal Filters - 0% = new; 100% = exhausted.
- Process # - Total number of processes executed.
- Status – Instrument status: STAND-BY = waiting for a process start.
- Purge – Cleaning cycle status: DONE = executed.
- SPC content – The number on the left indicates the reagent currently filled into the SPC, the number on the right indicates the last reagent filled in the SPC.
- Alarms – the number of the current alarm.

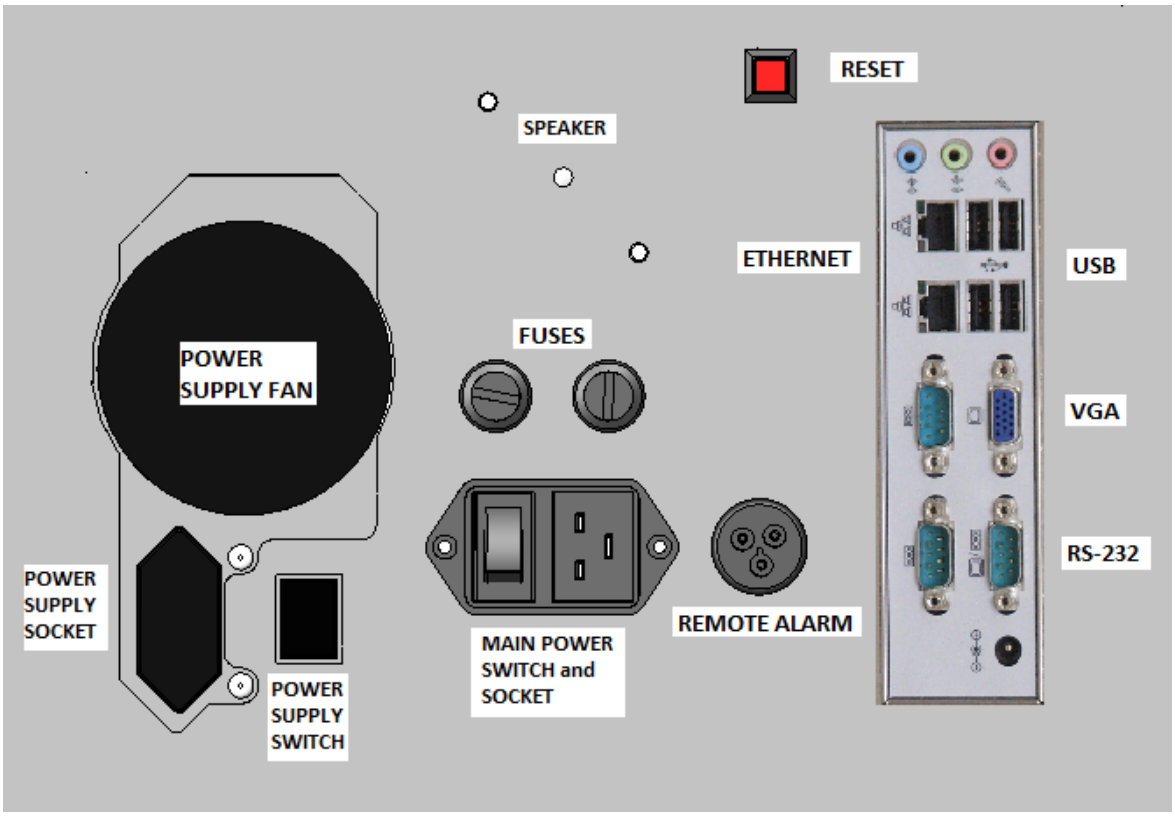
The MAIN menu (day by day operations) will appear by pressing the START button (left side).
The SETUP menu will appear by pressing the SETUP button (right side).

A synoptic showing the most important instrument components is always visible on the left side of the screen.

Screen Saver

Modern LCD screens life is quite long but the lamps that provide screen's lighting are characterized by a much shorter life. For this reason a screen saver device cuts-off the screen power 30' after the last time somebody touched the screen surface. A simple touch in any place of the screen surface will re-start the power and the screen functions in approximately 1 second. In case the screen would not wake-up, it will be necessary to switch OFF and then ON (after 10 seconds) the entire instrument from the main switch located on the rear panel. If also this attempt will fail, there is still the possibility, quickly after the switching ON of the instrument, to switch ON the screen by its small push button switch (which is located on the right bottom of the screen frame). It is recommendable to not touch the screen more than once to wake it up, the first touch it is not recognized as a command but only as a request to wake-up the screen, the following touches are recognized as commands and with the screen not yet visible may give unpredictable results.

Rear panel



Notes:

Remote Alarm socket:
No alarm = pins 1-2 closed, pins 1-3 open
Alarm = pins 1-2 open, pins 1-3 closed
This socket is a low voltage connection (maximum 48V, 1A) insulated from the rest of the instrument.
An Auto Dialler or other external alarm notification devices can be connected here.
Reset button: keep it pressed during instrument boot to reset the instrument transitory memory.
Power Supply Switch: it must be always at ON.

Installation and start-up

After the unpacking and the electrical connection to the main line the instrument is almost ready for the use; there isn't any particular transport internal device that needs to be removed. The next steps will be:

A) Installation of the two charcoal filter on their slots C1 and C2. Remove the cap from the charcoal filter bottle and make a hole with a screwdriver or a pencil in the tape that seals the air intake on the top rear of the bottle.
B) Connect the LCD screen. The LCD screen is transported unconnected in a separate cardboard box. The screen must be placed on the top left of the instrument housing. The electrical connection is made by connecting the 2 connectors on the instrument rear panel. One must be connected to the VGA, the other in one of the USB.
C) Connect the instrument to the main power. The power connection must provide a voltage compliant to the voltage indicated on the label in the back of the instrument and the ground.

It is recommended that the instrument is plugged into a wall socket equipped with Ground Fault Circuit Interruption (GFCI) protection, as an additional electrical safeguard.
In addition to the VTP300 anti-blackout feature, an uninterruptible power supply can be utilized to provide power in the event of power outages and some protection against power fluctuations, line noise and power spikes.
It is highly recommended that the instrument be operated away from heat (radiators, stoves, direct sunlight, etc.) and moisture (sinks, drains, etc.).

Check-list for using the instrument:

Initial stage set-up

- ❑ Check system time and date.
- ❑ Set reagent and protocol names.
- ❑ Check and set SETUP parameters.
- ❑ Setup the RMS parameters.
- ❑ Set protocols.
- ❑ Install charcoal filters.
- ❑ Fill wax and reagent bottles.

Before starting a process

- ❑ Check wax and reagent bottle levels.
- ❑ Check the processing chamber for cleanliness.
- ❑ Insert samples into the processing chamber.
- ❑ Firmly close the processing chamber lid.
- ❑ Select the desired program.
- ❑ Enter date and time of program completion (include a delay function if desired).
- ❑ Enter the number of cassettes processed.

At the end of a process

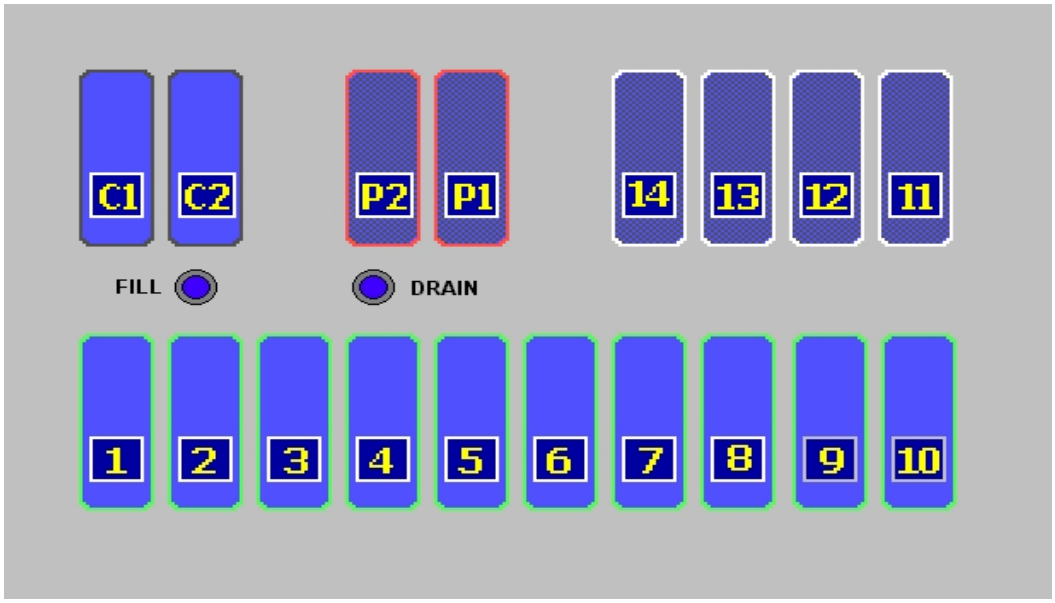
- ❑ Follow the instructions to empty the last reagent.
- ❑ Wait for complete emptying before opening the processing chamber.
- ❑ Take samples out of the processing chamber.
- ❑ Clean the SPC and lid of any wax residue.
- ❑ Execute the purge program.
- ❑ At the end of the purge program, check that the SPC and lid are clean of any trace of wax or foreign bodies. If necessary, complete the cleaning manually.
- ❑ Check the graph of the last process executed (from the Main Menu press the key GPH) to verify if the process has been executed properly and without any fault.

Reagents

Reagent tanks arrangement

The following picture shows the arrangement of the instrument tanks for reagents, waxes, purge agents and charcoal filters as seen from the instrument front.

C2	**Charcoal filter for waxes**
C1	**Charcoal filter for reagents**
P2	**Purge agent 2 (Ethyl Alcohol 95/100)**
P1	**Purge agent 1 (Xylene or substitutes)**
11 -> 14	**Waxes**
1 -> 10	**Reagents**
FILL	**Filling Port for RFD system**
DRAIN	**Draining Port for RFD system**



Compatible reagents

The following reagents can be utilized in the VTP300 without any risk of damage:

- Water
- Formalin
- Ethyl alcohol (pure or denatured)
- Methyl alcohol
- Xylene
- Xylene substitutes
- Paraffin Wax

The following materials are used in the construction of the VTP300. Reagents other than those listed above can be utilized in the instrument if they DO NOT damage the materials listed:

Stainless steel:	**Processing chamber, Rotating valve, connectors**
Teflon:	**Rotating valve, air pump**
Kynarflex:	**Reagent pipes**
Viton:	**Seals**
Glass:	**Vapour trap**
HDPE:	**Wax and reagent bottles**
Delrin (Acetalic resin):	**Connectors**
Nickel:	**Air connectors, solenoid valves**

The manufacturer is **NOT** responsible for damages due to the use of reagents **NOT** listed here.
WARNING: DO NOT use Acetone, Benzene, Toluene or Trichloroethane. We also advise against the use of fixatives containing mercury salts, acetic or picric acid as they may corrode the metal components of the instrument and shorten a component's useful life.

Disposable pre-filled bottles

The VTP300 can utilize disposable, ready-to-use, factory pre-filled reagent bottles.
It is very important to note that the use of pre-filled bottles is possible without making any changes to the instrument. It can be done at the same time with the use of bottles refilled by the user (the latter are simply thicker and stronger than the disposable bottles).

Advantages of using disposable pre-filled bottles include:
- Faster reagent and wax replacement.
- Minimal user handling exposure to toxic vapours.
- Reduction of risks from handling flammable substances.
- Eliminates the technician time required to empty, clean and re-fill bottles.

Replacement of disposable bottles is easy:
- Take the bottle containing the exhausted reagent out of its housing slot.
- Screw the special cap on the opening of the bottle.
- Unscrew the cap of the new bottle.
- Insert the bottle into its housing slot.

The procedures to be followed regarding the recycling of contaminated reagents are the same adopted with traditional systems. VTP300 bottles are made of completely recyclable (100%) HDPE (high-density polyethylene). Check with your local recycler about recycling HDPE with chemicals and wax residue.

Filling reusable reagent bottles

The emptying and subsequent refilling of reusable reagent bottles must be done in accordance with all safety regulations for handling flammable and toxic substances. The procedure must be performed with proper ventilation and away from open flames and/or electrical circuits. Bottles must be filled to the indicated level; a volume of 2.5 litres. When exchanging bottles, use the special screw-caps supplied with the instrument to avoid reagent spillage and fumes. After emptying, dirty or encrusted bottles must be replaced with new ones. Avoid cleaning them with solvents or similar products. The o-rings and all the openings on the quick couplers should be checked periodically for cleanliness. If the quick couplers leak, the o-rings should be replaced. If leakage problems persist, contact our customer service.

RFD – Remote Fill and Drain system

The Remote Fill and Drain allows the draining and the filling of the reagent bottles (with the exclusion of the waxes) without removing them from their slots. The RFD connectors are placed in the front of the instrument as shown in the picture in the previous page. In the left side there is the one for the FILL while in the right there is the one for the DRAIN. To those ports it is necessary to connect the hoses with quick connectors and 90° elbows that will be placed inside the external tanks with the waste and the clean reagent.

The RFD can work in three different modalities:
Modality “DRAIN and FILL”:

- The VTP300 fills the SPC with the content of the chosen bottle.
- Then it drains the SPC through port 17 into an empty tank (right side quick connector).
- Afterward it fills the SPC with 2.5 L of reagent from port 18 (left side quick connector).
- Then it drains the SPC content into the chosen bottle.
- This modality completion takes approximately 6 minutes.

Modality “Only DRAIN”:

- The VTP300 fills the SPC with the content of the chosen bottle.
- Then it drains the SPC through port 17 into an empty tank (right side quick connector).

- *This modality completion takes approximately 3 minutes; it can be useful in case there is the need of a complete washing of the chosen bottle before to proceed to its filling.*

Modality "Only FILL":
- The VTP300 fills the SPC with 2.5 L of reagent from port 18 (left side quick connector).
- Then it drains the SPC content into the chosen bottle.
- This modality completion takes approximately 3 minutes.

Caution: obviously in this last modality the chosen bottle must be empty before the start of the operation, in case the fill is performed on a not empty bottle there will be a spill of reagents into the nearby bottles and possibly also outside of the instrument.

After the first few steps in which the computer asks for information regarding the bottle required for fill/drain and confirmation about the presence of tanks connected to the ports 17 and 18, all the cycles are completely automated and the instrument can be left unattended until the operation ends.
See also sub-chapter SETUP > PARAM. SETUP > RFD calibration for more information about the RFD precision and its calibration.
The RFD can also be used in conjunction with the RMS during the reagents substitution.

It is possible (but not recommendable) to interrupt the execution of the RFD by pressing the ESC key. Pressing again the ESC key the RFD will be definitely aborted while pressing ENTER it will be re-started.

In case of events that would have stopped half-way the execution of the VTP300 (for example: alarms or mistakes on the tanks positioning) if some reagent is left into the SPC it is possible to remove it (draining it back to a bottle) by using the function DRAIN SPC in the Service menu.

It is highly advisable to take every precaution during the handling of reagents potentially flammable or toxic. Despite the RFD operator safety increases (thanks to the fill/drain automation), there is always some risk on handling flammable and/or toxic substances. We recommend to always have at hand a suitable extinguisher or at least to know the exact location of the closest one accordingly to the local rules of your country and laboratory.

CAUTION, always check what follow:
- **Verify that the external pipes are well connected the quick couplers and are correctly inserted into the external tanks.**
- **Verify that the external tank for the waste reagent would have at least 5 litres remaining capacity.**
- **Verify that the tank with the new reagent would have at least 2,5 litres available for the filling and that the pipe end reaches the tank bottom.**
- **Verify that the room in which the RFD is performed would be adequately ventilate (the RFD doesn't have a recirculation system on the external tanks)**
- **In case different kinds of reagents are drained together into the external waste tank, before to do it, in order to avoid potentially dangerous chemical reaction, verify their chemical and physical compatibility.**

Filling wax bottles

In the VTP300 the paraffin waxes are contained in the same bottles used for reagents.
The advantages of it are the following:
- Easy handling and emptying of the wax bottles.
- Easy and economical substitution of the wax bottles.
- Possibility to use the instrument in "Factory pre-filled" modality also for the waxes.

There is only one disadvantage: bottles must be re-filled with melted wax. Attempting to fill them with flakes, other than to be uneasy, may produce under fill conditions that will cause a blocking alarm. Furthermore, the filling hose cannot be inserted into bottles 11-14 (located in the wax heating chamber), in presence of not melted wax.

The filling level is the same for reagents and wax (2.5 litres).
Wax bottles are placed in a special heating chamber that maintains a constant temperature consistent with the temperature required for the waxes during the process.
There are 5 wax bottle slots. The one labelled “R” contains a spare bottle, thus:

- In “Factory pre-filled” mode the “R” slot in the wax heating chamber is used to melt the paraffin prior its utilization as a replacement of a dirty bottle.
- In “Standard” mode the “R” slot can be used to keep a wax bottle warm for immediate replacement of a dirty bottle.

CAUTION: Since the normal wax temperature approaches the level at which a first-degree burn may be possible, we recommend the following:

- **Always wear protective gloves and eyewear when handling bottles of wax.**
- **Always place a cap on wax bottles immediately after their removal from the wax heating chamber.**
- **Handle them with care.**
- **The wax heating chamber door is insulated and must be kept closed except when extracting or replacing bottles.**

WARNING: Never leave a slot without a bottle; the bottles should always stay in their slots with their normal wax level of 2.5 lt. The absence of one bottle may cause an incorrect heating of the other bottles.

View of the wax warm chamber (WWC)

Wax Cleaning Cycle (WCC)

Use of the WCC will reduce the consumption of paraffin by approximately 50%. The system is able to reduce paraffin consumption by removing the contamination of the preceding reagents.
The removal is accomplished by a flow of air bubbled through the wax containers.
The volatile reagents evaporate due to the heating of the wax containers during the WCC process. The air bubbled through the wax carries these reagent vapours through the charcoal filter C1 where them are trapped.

Use of the Wax Purification Cycle, while it will reduce consumption of waxes, will also shorten the estimated life of the charcoal filters, therefore we estimate that:

- Without the use of the WCC, filter life will be from 90 - 120 processes.
- With the use of the WCC, filter life will be from 60 - 90 processes.

These values are only estimates because they are influenced by:

- Environmental factors (humidity, temperature).
- The duration of the processes.
- The application of the vacuum (or pressure) on all the steps of the process.
- The frequency of reagent agitation.

The duration of the Wax Purification Cycle is about 30 minutes. If the WCC option is selected, it will begin automatically after each purge cycle, but only when a wax has been used in the preceding process.

It is always possible to manually run a Wax Purification Cycle from the RMS Setup Menu, independent of wax usage in the previous process. During the WCC the waxes are not transferred from their containers; the SPC will stay clean and it will not be necessary to start a purge cycle after the WCC. However during the WCC, the SPC lid must always stay closed.

Processing capacity

The VTP300 is equipped with 2 stainless steel baskets of identical dimensions. Each of the baskets can hold up to 150 cassettes. The total processing capacity therefore is 300 cassettes. As optional accessory is available a large basket that can hold big specimens or up to 350 STD cassettes.
As with all tissue processors, good processing quality requires that certain guidelines be followed:

- Processing every day large quantity of samples, the reagents will need to be replaced more often.
- Larger specimens require longer times at each station.
- The use of vacuum (or pressure/vacuum cycles) and reagent heating in each step of the process improves infiltration.
- The daily replacement of the most contaminated reagent, with subsequent “shifting” of the remaining reagents, is preferable to the periodical substitution of all reagents. In this way, the process quality remains constant; while in the latter method process quality varies from a maximum (with all new reagents) to a minimum (last process before all reagents are replaced).

The VTP300 Reagent management System will minimize the “shifting” process work because it will not be necessary to physically move (shift) the reagent bottles into adjacent slots. The RMS will automatically select the most contaminated reagent first and the least contaminated reagent last.

SETUP of the instrument

From the SETUP menu it is possible to modify the most important instrument parameters (except processing protocols), in this menu are located all the parameters that do not require frequent access.

PARAMS SETUP

Here the main parameters can be modified. After the modifications, by pressing SAVE the new values are stored in the memory; by pressing ESC modifications are discarded. Any case it is necessary to press ESC to get out from the function.
In the first row on the top right of the PARAMS SETUP screen the current software version is shown. For example: “SW version 5.5 – VTP300”. The only relevant parameter for the instrument user is the software version; the others are related only to manufacturing internal use data.

Languages

Seven languages are available: English, French, German, Italian, Spanish, Czech and Turkish.

Date Format

In the USA the date format is: month/day/year. In Europe the format is: day/month/year.
Also the time is displayed in a different way. Here it is possible to choose the desired format.

Elevation

The ambient pressure decreases together with the elevation from the sea level (approx. 100 HPa less every 1.000 meter for the first 2.000 meters). It is important to tell the instrument what is the level at which it is installed to avoid it to require the air pump to reach differentials of pressure (levels of vacuum) impossible to make especially when the elevation is higher than 800-1000 meter.

L/L Alarming

The displays of the ALERTs during the processing (low level not blocking alarms) can be enabled/disabled.

EOP Signal

The End Of Process beeping can here be enabled/disabled.

Printer Port

If the printer is not installed this port must be disabled. This way the program execution will be faster.

SPC lid open/closed sensor

The SPC lid status is controlled by a sensor (micro-switch). If the lid is closed but the system displays that it is open, probably the micro-switch is broken or out-of-position. Waiting for service, from this function the sensor can be disabled, after that it is possible to continue to operate the instrument. If the micro-switch is disabled the SPC lid indicator will show the label “DISABLE”. Please note that the sensor can reveal the lid complete opening but cannot sense its perfect closing. Thus if the lid is simply turned down but the lock is not engaged, the sensor may indicate lid closed, but the instrument will not be available for processing. The instrument will allow the process or purge start but soon it will issue an alarm caused by the impossibility to create vacuum or pressure in the SPC. Please always check the correct lid closing and lock engagement before the start of any kind of operation.

WWC setpoint

This function allows the setting of the WWC temperature setpoint. The range is 55° - 65°C.
It is advisable to set its value to the highest point compatible with the laboratory procedures. Particularly it is necessary to set the value at least 2°C over the declared paraffin melting point. For example for paraffin with a melting point of 56-58°C the correct WWC setpoint value would be 60°C.

RFD calibration

This procedure allows the calibration of the volume of reagent filled during the RFD cycle (Remote Fill/Drain).
To find the right value proceed as follow:
- Using the RFD execute a fill in one of the reagent bottles.
- With a system sufficiently precise (+/- 10mL) take a measurement of the filled reagent.
- Set the calibration value considering that every increase of 10 corresponds to +25 ml.
- Repeat the filling with the RFD to check if the correction has given the right result.

The standard precision of the RFD is +/- 1%, which corresponds, respect to the standard value of 4 litres, to a maximum of 4.04 litres and a minimum of 3.96 litres.
The above cited values are compatible with the correct functioning of the processor in normal conditions.

UPS unit (Uninterruptible Power Source)

The VTP300 can be equipped with an optional UPS. To be recognized by the VTP300 computer the UPS must be enabled by this function, as well as it can be disabled in case of malfunctions. Please note that both enabling and disabling are related only to the VTP300 computer -> UPS unit communications. Even if disabled by this function, the UPS will continue to supply power to the VTP300 but its state will not anymore shown and considered. In case of an attempt to enable the UPS when the UPS is not installed, the command will be refused. In case of serious malfunctions of the UPS it may be not sufficient the software disabling, in this case it is advisable or necessary to physically disconnect it from the VTP300. Please call our technical service to perform the repair or the disconnection.

Panel On Time (screen saver time)

After a period of not utilization of the touch screen, the LCD screen is completely switched off to extend its life span and save energy.
This function allows the setting of the panel ON time:
- The minimum time is 0 minutes (function disabled, screen always ON).
- The maximum time is 90 minutes.

The tissue processor will continue to work perfectly even when the screen is switched off, by touching any point

in the screen surface it will be switched on in not more than 2 seconds and the VTP300 computer will emit a beep to confirm. It is advisable to not press more than one time the screen surface and wait for the screen data and pictures to be visible before to perform any command. The first touch will not be considered a command but any subsequent touch may be recognized as a command.

RMS SETUP

Please see the RMS chapter ahead in the manual.

TIME and DATE

A screen opens to display day, month, year, hour, minute and second. Press on the field to be changed, then increase or decrease its values with "+" and "-" keys. Press CONFIRM to save changes and to go back to the previous menu. Press ESC to abort changes and to go back to the previous menu.

Password Setup

The VTP300 is endowed with a password system that allows the access restriction to the main functions of the instrument. Password general rules:
- In case of wrong password the system shows a specific error message.
- The password field accept up to 12 characters or numbers (mix is allowed).
- Also empty spaces are admitted in the password composition.

Enable/Disable Password

This function allows the enabling and disabling of the Password. If the password is not active the systems requires the definition of a new one. If the password is active the system allows the disabling by typing the current password correctly. **We recommend to carefully keep note of the password before the activation because once activated there is no way to deactivate it without knowing it. In case the password is lost it is necessary the intervention of our technical service to deactivate or retrieve it!**

Password modification

The password can be modified any moment from this function, but of course, the modification is allowed only after the correct typing of the current password. **We recommend to carefully keep note of the new password before the modification because once modified there is no way to deactivate or modify it without knowing the current one. In case the password is lost it is necessary the intervention of our technical service to deactivate or retrieve it!**

Password protection map

There are nine functions that can be protected by password. The lab manager must decide what to protect in relationship to real security reasons. It is advisable to use the password only where it is really necessary.
The extensive usage of the password while increasing the instrument security may create problem to the day by day operations. The password will be requested for the activation of each protected functions and can be requested many times during the usage of the instrument (for example during the RFD it will be requested for each bottle managed), that may result to be bothering but it is necessary to guarantee a real protection of the instrument especially when the work done is multiple and complex (as it is during the RFD). If the RFD is under password its usage will be protected during an execution of it from the RMS even if the RMS is not protected.

There are various levels of protection that can be achieved with this system:
1) Total protection: all functions activated.
2) Programming protection: only the instrument programming functions are activated.
   - Edit Process
   - RMS Setup
   - Parameters Setup
3) Mid level protection (recommended), only the functions more delicate are protected:
   - Edit Process
   - Abort Process
   - RMS Setup
   - Parameters Setup
   - Service

Of course, also to access the password map modification it is necessary to know the current password.

REAGENT LABELS

The most common reagent names are already set in factory. It is possible to modify them as desired. Up to 40 labels are available here.

SERVICE

With this function various instrument tests can be performed. Please see the chapter SERVICE.

EXT. SERVICE

This function is protected by a special factory set password and it is reserved to service technicians.

Programming process protocols

This function can be accessed from the START menu. Select a process protocol from the menu by pressing on the related icon. The available protocols 18. A new screen will open showing the entire process content.
With the ARROW keys it will be possible to explore the entire table to select the field to edit. Each field content can be varied by using the extended character keyboard or, in same case, by using the +/- keys. Each field can also be accessed by just pressing on it. Press SAVE to save changes and exit the function. Press ESC to abort the operation.
Below are explained limits and characteristics of each field:

REAGENT

Reagent names are labels prepared in advance as explained before. They do not have an influence on the process. The tank content is decided in the RMS setup menu with the function “Define Reagents”. Therefore it is necessary to pre-define them in advance even if the RMS is not used.

TIME

The station time can be set from 0 to 99 hours. The data control function can give unexpected results in case a number higher than 59 is entered in the field of the minutes. For example: entering 1 or 2 digits and moving over another field the entered number is interpreted as minutes, if the number is higher than 59 it is transformed in hours and remaining minutes, thus: 60 will be transformed in 1 hour and 0 minutes, 65 will be transformed in 1 hour and 05 minutes and so on. Entering more than 2 digits the result may appear more strange when the last two digits entered are higher than 59. Thus: the number 159 will be transformed in 1 hour and 59 minutes, but the number 160 will be transformed in 2 hours (1 hour + 60 minutes = 2 hours). The number 1099 will be transformed in 11 hours and 39 minutes and so on. Initially this particularity may appear cumbersome, but by respecting the principle of not entering more than 59 at the end of the time string, nothing unexpected will happen. If a time of 0 hours and 0 minutes is set, the step will be ignored even if the other parameters (temperature and vacuum) are set. The station time includes the reagent filling and draining times (approx. 3 minutes)

Temperatures (Temp)

The selectable reagent temperature range is: 0 for ambient, from 20 - 45° C.
The selectable paraffin temperature range is: 52 - 65° C.

Processing pressure (PV)

The Pressure/Vacuum field allows the selection of the following options:
A = ambient pressure.
V = vacuum, SPC pressure will be lowered to 600 HPa below ambient.
P = pressure, SPC will be pressurized up to 200 HPa above the ambient.
P/V = an alternating cycle with an 8 minute frequency of pressure and vacuum.
Varying the pressure in the processing chamber facilitates reagent infiltration into tissue specimens. The following P/V settings are recommended:

- Biopsies = Vacuum or ambient pressure.
- Samples of normal size = vacuum in every station.
- Mix of biopsies and normal samples = vacuum in every station.
- Large samples = cycles of pressure and vacuum in every station.

It is not recommended to simultaneously process samples of very different sizes.

Reagent agitation (MX)

The reagent mixing in the VTP300 is accomplished by bubbling air up from the bottom of the processing chamber. Select from the following frequencies:

- 0 = no mixing
- 1 = one mixing every 30 minutes
- 2 = one mixing every 20 minutes
- 3 = one mixing every 15 minutes
- 4 = one mixing every 10 minutes
- 5 = one mixing every 5 minutes

Process # 18: Reversed

Process #18, REVERSED possesses all the characteristics of the other programs except:

- ❑ It begins at the last non-zero time on the steps list and moves backwards (REVERSED).
- ❑ It is not possible to insert a delay on the first step.
- ❑ The operator cannot modify its name.
- ❑ Its position in the list of the processes is always the #18.

Except as specified above, it is identical to the other processes, therefore:

- ❑ It increments the RMS counters.
- ❑ All RMS rules are respected.
- ❑ At the end of the process, user will be prompted to run a purge cycle.
- ❑ At the end of the purge cycle, if during the last process at least one paraffin was used, the WCC will be automatically started.
- ❑ At the end of the WCC, the Reagent Management System will be started.

There are no particular restrictions to the use of this process, however be aware that the reagent contamination will also be reversed.

Reagent Management System (RMS)

RMS basic concepts

A Reagent Management System in a tissue processor is necessary to:

- Optimize the reagents utilization.
- Avoid the not recommendable bulk substitution (altogether once a week for example).
- Avoid boring and not reliable paper records.
- Avoid the manual movements of tanks to prepare the instrument for the next process (for example by manually substituting the dirtiest tank of a group of reagents and shifting the other tanks backward).

In the VTP300 the usage of a good RMS is much more important given that, as explained in other chapters, the instrument can be used for fast and for slow processes with a different utilization of the reagents. The reagent management is made more complex by the fact that, while slow overnight processes use all the reagents, fast processes use only a few reagents, normally one per group. Moreover in these fast-short processes there is the need to use the best reagent for each group.

The concept of “homogeneous group” is based on the type of reagent and the kind of work that it does. In the tissue processing 4 fundamental types of reagent can be identified:

- Fixative
- Dehydrant
- Clearing agent
- Embedding agent

The dehydrants can be split in two sub-groups: low and high gradation.
Sometimes a tank with water is set between fixative and dehydrant to remove from the samples as more as possible fixative that in contact with alcohol can form noxious salts.
Thus, considering that a group can be constituted by one tank, usually in a tissue processor there are 4 to 6 groups. Some users set the dehydrant in a way to form an incremental scale that can bring the number of groups over the above mentioned total of 6. It is here important to note that the VTP300 RMS accepts a maximum of 8 groups.

It is highly advisable to not form too many groups, 5 or 6 groups are the ideal situation for a successful reagent management and the samples best quality. Particularly a maximum of two groups of dehydrants are sufficient to guarantee a correct incremental alcohol gradation. But also a single big group of dehydrant has demonstrated to work fine provided that at the first start of the instrument a certain incremental gradation has been manually created.

Other important concepts of the VTP300 RMS are:

- The reagents are maintained at the end of every process to keep **constant** the specimens quality. The VTP300 RMS most important concept is based on the assumption that the **constancy of the quality** is more important than the quality itself.
- The reagents used first in each group are those that are more polluted by the previous reagent and by the substances removed from the samples. Accordingly, those are the reagents that require the most frequent replacement.
- During the reagent maintenance the RMS will require the substitution of only one reagent per group also when more than one tank in that group has exceeded the pre-defined limit.
- **In a fast-short process (with only one reagent per group activated in the process program) the RMS will select and use the tank with the best/youngest reagent independently from its position inside a group (meaning for position both the real position and the programmed step position) of that tank.**

- Once the RMS is activated, it is not anymore possible to consider the physical position of the tanks or their position in the program (STEP). It will be necessary to "fully trust the instrument" and follow its instructions regarding the substitution of the reagents. When there is a doubt that something is not working properly (for example, in case of poor tissue quality) it will be necessary to replace all the reagents and use the counters reset functions to reset the counters. In this case it is recommended to reconsider the RMS settings and decrease the limits until a substantial tissue quality is obtained.
- It is not possible to foresee a RMS standard setting. The RMS ideal setting is strictly related to the kind of usage done with the VTP300 (type and quantity of fast-short and slow-long processes performed, type of reagents, type and quantity of samples processed), that ideal setting may be experimentally found after a few weeks of continuous and regular use of the instrument.

The DAF (Decreasing Aging Factor)

In order to obtain a good reagent management it is necessary to set the RMS not only in terms of type of reagents used but also in terms of predefined limits (that will trigger the reagent substitution) set for each reagent tank. In the VTP300 the limits are based only on the number of cassettes processed.

Those limits will be defined for each tank of reagent (see next chapters), it is here important to describe how the limits will be handled by the RMS:

1) The limit (maximum number of processed cassettes) is defined for each tank independently from the group to which that tank is assigned.
2) The number of processed cassettes will be then stored in memory for each tank and will be reset after that tank reagent renewal.
3) Also the number of processes performed by each tank is stored in the memory, but it will be used only to be shown under request of the operator, also this counter is reset after that tank reagent renewal.
4) The real effective counter is a third one, its name is DAF (Decreasing Aging Factor).

The DAF is calculated from:

- ✓ The number of cassettes actually processed.
- ✓ The position of a tank in its group.

The concept is based on the assumption that in a group the reagent that will age more is the first one while the last is the one that will age less. Thus, inside a group, the number of processed cassettes will be assigned to the DAF counters in a decreasing manner, for example:

Group taken as example: Clearing
Processed cassettes per process: 100
Regressive percentage of the DAF inside a homogeneous group:
100, 60, 40, 30, 20, 15, 10 (minimum admissible)
Predefined limit for the 3 tanks of this group: 300 cassettes

End of process 1

Tank	Processed Cassettes	DAF (regressive counter)
8	100	100
9	100	60
10	100	40

End of process 2

Tank	Processed Cassettes	DAF (regressive counter)
8	200	200
9	200	120
10	200	80

End of process 3

Tank	Processed Cassettes	DAF (regressive counter)
8	300	300
9	300	180
10	300	120

At this point the RMS will require the substitution of tank 8 because its DAF has reached the predefined limit of processed cassettes, after the substitution the counters of this tank will be reset. In the next process the tank number 8 will be the last in the group and, at the end of the process, the counters will be as follow:

End of process 4

Tank	Processed Cassettes	DAF (regressive counter)
9	400	280
10	400	180
8	100	40

After process 4 the RMS will not require any substitution because none of the counter reached or exceeded the limit.

End of process 5

Tank	Processed Cassettes	DAF (regressive counter)
9	500	380
10	500	240
8	200	80

After process 5 the RMS will require the substitution of tank 9 because its DAF has exceeded the limit.

End of process 6

Tank	Processed Cassettes	DAF (regressive counter)
10	600	340
8	300	140
9	100	40

And so on.

The sequence here shown (typical of a long overnight process) would be surely influenced, in the real world, by variations in the quantity of cassettes processed and by the usage of fast-short processes with only one tank per group. In this case, without using the RMS, it would be quite complex to keep trace of the reagents unbalanced aging. At the opposite, thanks to the RMS, the tracing of the reagents aging is automatic, precise and reliable.
The RMS is not as rigid as it may appear; if for any reason (malfunction of a tissue processor component, accidental loss of reagent from a tank, etc.) it is necessary to substitute a reagent independently from the RMS requests, that can be done by the RFD (that will automatically reset the tank counters) or manually**, in the second case it will be necessary to reset the tank counters by the RMS setup menu**. Of course, during the next process, that tank will be the last used in its group.

RMS setup

The VTP300 RMS is a system to punctually and exactly manage all reagents to guarantee a constant process and sample quality.
The use of the Reagent Management System eliminates the need to make annoying written annotations of reagent tank status. This results in substantial time savings and eliminates the possibility of errors caused by multiple operators using the instrument.

Although explained later in more detail, basically, following the purge cycle (and the WCC, if activated), the system will automatically prompt the user to replace the reagents that have reached their pre-determined processing limit.

RMS Define Reagents

Defining reagents allows the operator to identify the type of reagent that is used in any single tank. The labels to be used here must be prepared in advance in the instrument SETUP.
It is important to notice that the assignment of a reagent name to a tank in the RMS automatically updates the reagent names in the process programs.
However, it is important that the reagent label corresponds exactly to the content of the tank defined during the setup of the RMS. This is due to the fact that later, when the RMS will prompt the user to replace a tank, it will suggest the reagent that needs to be filled in the tank accordingly with what programmed here; if the label is not consistent with the reality a mistake can be easily made.
For example, if the reagent label “Paraffin” is assigned to the tank in position #4 (which is not located in the wax chamber), later when the RMS prompts the user to replace tank #4, the user will be instructed to put “Paraffin” in that position. Clearly, this would be an error. Therefore it is important to carefully plan the entire reagent selection process prior to setting up the RMS.

RMS Define Limits

The definition of the limits determines the frequency of reagent substitution. It is possible to assign to each tank a limit based on the number of cassettes processed. When this limit is reached or exceeded, the RMS will require the substitution of the reagent for that specific tank. If the limit is set to zero, the RMS will never prompt the user to replace the reagent in that tank but its quality light will always be shown in red to remind that this tank is not managed by the RMS for a lack of limit. It is advisable to fix the same limit to all the tanks of a group, otherwise the RMS can ask for unbalanced substitutions with unpredictable results. Moreover the limit can be proportioned to the length of a group, in other words the longer is a group the higher can be the limit.

RMS Counters Total Reset

The Counters Total Reset selection allows the user to set to zero the number of processes performed and the number of cassettes processed including the DAF counter. This function may be used when it is necessary to replace/renew the reagents of all tanks and, at all the effects, restart the RMS.
The complete zero resetting does not include the counters for the charcoal filters or the tanks of the purge reagents. These two counters can be reset using the “RMS Single Counter Reset”, see next sub-chapter.
Please note: the counters total reset automatically occurs each time the RMS is activated or de-activated. When the definition of the reagents/groups and/or their limits are modified the system doesn’t make any automatic reset of the counters. That was decided to give to the user the maximum freedom, but in case of modifications on the run it will be necessary to act carefully and eventually manually reset all or some of the counters (see next sub-chapter).

RMS Single Counter Reset

The Single Counter Reset selection allows the user to reset the counters of individual tanks. This function is useful if the user decides to replace/renew a reagent before the preset limit of a particular tank is reached.
The Single Counter Reset is also the only function that allows the operator to reset the counters of the charcoal filters and the purge reagents. **Please note: The counters of the charcoal filters and purge reagents are not reset by the Counters Total Reset function.**
Whenever the user replaces the purge reagents or the charcoal filters without being prompted by the RMS, it will be necessary to utilize the Single Counter Reset to reset their counters.

RMS On/Off

This function turns the RMS ON or OFF.
Every time the RMS is set ON or OFF all reagents counters are set to zero. In this case it is recommendable that all reagents will be replaced prior to use the instrument again.

Other functions of the RMS setup menu

Purge reagents limits setting

The purge reagents are also under the supervision of the RMS. It is therefore sufficient that the RMS is active to have it recommend the substitution of the purge reagents every 3 to 9 processes. The recommended numbers of processes for the substitution of the purge reagents are as follows:

- Cleaning only the SPC: 9 processes.
- Cleaning the SPC and the baskets: 5 processes.

The aforementioned quantity is valid for correct use of the instrument. It is, however, contingent upon the manual removal of as much residual paraffin as possible (from the lid and SPC) before beginning the purge cycle.

Please note: if the user desires to replace the purge reagents before their counter reaches the preset limit, it will be necessary to reset the counter by the “Zero Resetting Single Counter” function.

Charcoal filters limits setting

The charcoal filters are also administered by the RMS. In addition to the percentage indicator visible on the Main menu (with 0% representing a new filter and 100% representing an expended filter), when the filters reach or exceed their preset limits, the RMS will prompt the user to replace them at the same time he is prompted to replace reagents.

The charcoal filters should be replaced between a minimum of 60 and a maximum of 120 processes based upon the following factors:
- Without the use of the WCC the filters should be replaced every 90 to 120 processes.
- With the use of the WCC the filters should be replaced every 60 to 90 processes.

These values are somewhat approximate because can vary due to:
- Environmental factors (humidity, temperature).
- The duration of the processes.
- The application of the vacuum (or pressure) on all the steps of process.
- The frequency of agitation of the reagents.

If the VTP300 is operated in an area with high relative humidity, if pressure and/or vacuum is requested for most or all of the process steps, if the reagents mixing in the SPC is set to the maximum frequency, it will be necessary to set the limits for the charcoal filters substitution at or below the minimum values mentioned above.
Important Note: If the charcoal filters are changed before the process counter reaches the preset limit it will be necessary to reset the counter with the “RMS Single Counter Reset” function on the RMS Setup menu.

WCC activation / de-activation

The activation / de-activation of the WCC takes place on the RMS Setup menu. De-activation of the WCC is advisable when:

- An excessive consumption of the charcoal filters makes its use less advantageous than the paraffin savings. This may occur due to a combination of the environmental and usage factors mentioned above.
- The instrument is malfunctioning frequently. Discontinuing use of the WCC will lower the workload for the VTP300 and may eliminate one possible source of malfunction.

Manual start of the WCC

If for any reasons the WCC has been interrupted or not allowed to start automatically, it can be started manually by selecting “Start Wax Purif. Cycle” on the RMS Setup menu. If a process has been performed it is important to run a purge cycle before the WCC start.

RMS prints

From the RMS Menu it is possible to print the following information:
- RMS status.
- RMS settings.

It is always advisable to print the RMS settings and status before and after any meaningful change made on it. A printout of the RMS status can be useful if there is a doubt that something didn’t work properly during the reagent substitution and a check of the reagent situation and relative limits becomes necessary.

Using the RMS

Using the RMS is certainly simpler than setting it. It will be sufficient to follow its instructions when, after the execution of a process and the purge, and if any of the predefined limit has been exceeded, the RMS screen will automatically appear. The RMS can also be accessed manually by pressing RMS from the START Menu.

TK	REAGENT	DAF	LIM	CAS	PROC	SUBST.
1	FORMALIN	300	200	300	001	YES
2	ALCOHOL 95	300	200	300	001	YES
3	ALCOHOL 95	180	200	300	001	NO
4	ALCOHOL 100	300	200	300	001	YES
5	ALCOHOL 100	180	200	300	001	NO
6	ALCOHOL 100	120	200	300	001	NO
7	ALCOHOL 100	090	200	300	001	NO
8	XYLENE	300	200	300	001	YES
9	XYLENE	180	200	300	001	NO
10	XYLENE	120	200	300	001	NO
11	WAX 60	300	200	300	001	YES
12	WAX 60	180	200	300	001	NO
13	WAX 60	120	200	300	001	NO
14	ND	000	000	000	000	NA
P1	Xylene		003		000	NO
P2	Alcohol		003		000	NO
C1	Cha. Filter		060		001	NO
C2	Cha. Filter		060		001	NO

In the example shown above none of the reagent requires maintenance. The RMS table shows:
DAF = Decreasing Aging Factor counter.
LIM = predefined limits.
CAS = counter of the actual number of cassettes processed.
PROC = counter of the number of process performed.
SUBST = the tank that needs to be changed.
The counters of the purge reagents and the charcoal filter.

The colour of the tanks indicates the quality of the reagents as follow:
GREEN = new reagent or already used reagent but with DAF counter not exceeding its limit.
RED = reagent that has reached/exceeded the limit.
GREY = tank with not defined content.
BLACK = empty tank.

The screen will instruct the user to renew the reagent tanks that exceed the previously set limits. By pressing the “DO IT WITH RFD” icon the (current) tank substitution will be made with the Remote Fill & Drain system.

CAUTION:
- To avoid mistakes it is advisable to faithfully follow the given instructions and to confirm, by pressing CONFIRM, each singular substitution.
- The reagents must be substituted ONLY if the RMS requests for that.
- Is it possible but not recommended to suspend the RMS operations, by pressing ESC, then later restart (by pressing RMS from the START Menu) and complete it.

Processing with the VTP300

Checks and procedures before operating

- ✓ Check paraffin and reagent levels.
- ✓ Check and, if necessary, clean the processing chamber.
- ✓ Place the samples into the processing chamber.
- ✓ Close the processing chamber lid firmly.
- ✓ Select a program.
- ✓ Edit date and time of process-end.

Setting the program End-time

Before to start a process program it is necessary to check (and in case to set) the program time and date of completion.

In the above figure the top-left window contains all the EOP parameters.
The indication of the number of cassettes is compulsory.
Please Note: remaining in this screen, for every minute that elapses, the delay (if any) will decrease by one minute while the Program End-time remains constant. But if the delay time is set to or reaches zero, the Program End-time will increase.

Delay setting

By pressing on the fields their value can be changed. The computer will automatically update the total processing time, the date and time of completion, and the fields that indicate the amount of the delay expressed in days, hours and minutes. The maximum delay is 14 days, 23 hours, 59 minutes. It is not possible to set an End-time lower than what will result by adding the total process time to the current time.
Any delay programmed will extend the length of time the specimens will remain in the first reagent.

Process End-time memory

A convenient feature of the VTP300 is the automatic recall of the End-time:

- Every time a delay is requested or updated (thus every time an End-time different from the natural one is set) the computer stores the resulted End-time it in the long term memory.
- When a program is started, the computer will propose (recalculating the delay) the same End-time set during the previous start of that program. If no delay was set the computer will propose for the End-time the natural time: current time + total process time.
- The delay necessary to end the process at the predetermined hour and/or day is automatically calculated and displayed in the appropriate display field.
- To reset the delay, press “CLR”. The delay will be set to zero and the delay memory will be erased. The next time this program is started, the End-time will be the natural one. (current time + total process time)
- Any update of the delay/End-time here made will be stored in the long term memory only if the program is actually started.
- Obviously the instrument needs sufficient time to complete the selected process. If it isn’t possible to complete a process at the desired time, the computer will propose a different End-time.

Any case it is highly recommended that the user verify time, day and date of process completion before starting a program. If the End-time is incorrect, after the start of a program the only user option is to abort the process and restart it again with a corrected End-time. Process programs cannot be edited during processing.

Start from step different from the first

At the start of a program press the “UP” and “DOWN” arrows: note that the bar that highlights the step will move from the first step to every valid step (every step is valid if its time value is greater than 0). This feature can be useful, for example, on partially processed tissue samples to re-start their processing where it was interrupted.

Starting a process program

After the process End-time and the number of cassettes and baskets has been set, the data can be stored in the memory by pressing SAVE, then the program can be started by pressing START. Pressing the ESC key the operation can be aborted.

After the final start the following information will appear on the screen:

- Each step of the process with time, temperature, pressure and mix data.
- The current step highlighted.
- In the highlighted step, the time remaining will ramp down minute by minute until the step is completed.
- On the top of the process window the name of the current program and the scheduled date and time of completion and other information are shown.

Once a program is started, it is not required any other user intervention.
Processing step times and total time include the time necessary to fill and empty the SPC.

Interrupting (suspending) the process

When a process program is running, it is possible to suspend and later abort it but only during stationary phases (for example not during filling and draining).
To suspend a process, press SUSPENSION and, within 3 seconds, ENTER. The instrument will suspend for 3 minutes every activity. During this period it is possible to open the SPC lid. Pressing the key ENTER the process resumes. If the process is not resumed within 3 minutes, the instrument will try to do it by itself.
If the SPC lid is not closed an ALERT will be issued and a beeper will alert the user of the mistaken situation.
When the process is suspended it is possible to abort it by pressing the key ESC and after 1 second pressing again ESC three times in sequence. The SPC will then be drained, after that the samples can be removed. As said, the interruption of a program is only possible when the reagent is in stand-by in the processing chamber and not during the other steps (filling/emptying, positioning the rotating valve, etc.).

Opening the SPC lid during a process

There are situations in which the processing chamber lid CANNOT be opened (when the SPC is under vacuum). Others in which it MUST NOT be opened (during fill and drain operations).
NEVER open the SPC while a program is running in a phase other than "Processing". Alarms may occur and the computer control system may abort the process.
Moreover, potentially toxic or flammable substances may exit from the SPC.
The SPC lid is equipped with a micro-switch that detects if the lid is open or closed, thus, if the lid is opened during a process, the process it is automatically suspended. But before to open the SPC lid it is BETTER to suspend the process by pressing the keys ESC and ENTER in sequence. This will signal the system to normalize the SPC pressure and equalize it with the ambient pressure.

As said the SPC lid can be opened when the message line displays "Processing".
Please take the following precautions:
1) Suspend the process before to open the SPC lid.
2) Close back the SPC lid as soon as possible.
3) Respect all the safety rules about precautions to be taken when handling toxic or flammable substances.
4) If the system is processing during a vacuum step, after the lid handle opening, it will be necessary to wait that the system suspends the process and perform the VACUUM RELEASE before the opening of the SPC lid will be possible. The message line will then display "Normalizing pressure in the SPC" and, after 10 seconds, the SPC lid can be opened.
5) If the processing chamber is not closed within 3 minutes, an ALERT will occur (20 PROC SUSPENDED) and a beeper will start to sound. When the SPC lid is closed back the process is automatically resumed after a while or the process can be resumed by pressing the key ENTER.
6) If the opening of the chamber is difficult, DO NOT force it, wait for the ambient pressure to be resumed.

Instrument auto-tests

Before and during the process the system verifies if there are the right conditions to start/continue the work.
At the start of a process a series of parameters are checked, if one of them is not conform to what is required to safely start the process, the start is aborted and a message is shown so that the user can take adequate measures to remove the fault condition (See also the chapter "Safety devices – Runtime test").
During the process another series of checks is performed continuously to ensure the safest sample processing. For example: before to fill a bottle the filling pipeline is tested to ensure that there isn't any clog or reagent of the previous step left in the SPC. If the pipeline is not completely open Alert 6 and Alarm 53 are issued, that specific bottle is jumped, and the process continues on the previous bottle (which will be reloaded) with the time of the jumped step. If two adjacent bottles are found faulty a blocking alarm is issued and the process is aborted.

Process completion

At the end of a program, the instrument maintains the last reagent in the processing chamber. Press ENTER to empty the chamber. After the reagent draining, it is possible to open the SPC and take out the samples.
After the confirm that the samples have been taken out of the SPC the computer will prompt a message with a request to start the purge program. If the program included paraffin steps, the purge execution will be compulsory.

Purging the SPC

The purge is necessary to remove wax residue from the process chamber. It is always necessary if wax was used during the last process. It is advisable to perform any case a purge even if in the last process no wax has been loaded into the SPC, only in case the loaded reagents where formalin or alcohols the purge can be jumped without any problem.

The FIRST purge program has been set and optimized by the manufacturer and cannot be modified, but there are other 3 purge programs that can be on some extent modified by the user.

It can be started anytime from the Main Menu, however at the end of a complete process the purge start is automatically requested by the system, it can be jumped by pressing the ESC key, but, if a wax was loaded during the last process, the following process start will be denied until a purge is performed.

Press “ENTER” to start the purge. As well as in any other program, the purge cycle can be aborted by pressing ESC and then ENTER within 3 second.

The bottles containing the purge reagents are labelled with P1 and P2 and must contain: (P1) xylene (or substitutes), the second (P2) 95 or 100% ethanol. The reagent must be substituted every 3 to 9 purge process (see sub-chapter “Purge reagents limits setting”).
The removal of wax residues before the start of the purge program is useful to extend the life of the purge reagents. Avoid the use of sharp tools that can damage the processing chamber surface.
Even if the processing chamber is maintained at the last wax temperature till the execution of the purge cycle, it is preferable to run the purge cycle immediately after the process.
The purge total time duration is 64 minutes.
The last purge step is the drying of the processing chamber from any alcohol residue. This step is not critical and can be stopped at any time without damaging the instrument.

Jumping the drying step the purge total time is reduced to 34 minutes.

Advices and suggestion for processing

Timing

The most common processing program has a stationing time of one hour for each step/bottle.
Is suitable for the vast majority of histology samples, moderate variations on the timing are sometimes adopted in relationship to specific needs and the kind of reagent used
For example:

- The xylene substitutes may require a time longer than the xylene.
- Higher reagent temperature allows shorter timing.
- Also the use of vacuum may allows shorter timing.

Vacuum and Pressure

The pressurization or de-pressurization of the SPC allows a better sample infiltration.
Normally the use of vacuum (de-pressurization) is sufficient to obtain a good infiltration for most of the samples and it is advisable in each station except for the formalin and the first wax.
The combined use of vacuum and pressure should be limited to the processing of very difficult samples (big and/or fatty). The usage of P/V with normal samples, other than uselessly expend the processor components, may cause undesired samples over-processing.

Heating

The reagent heating in the SPC up to the maximum allowed temperature (45°C) is advisable starting from the 2-3 reagents before the waxes to prepare the samples to the thermal jump from the ambient temperature to the 60°C of the waxes.
Moreover pre-heating the samples (and the SPC and the baskets) helps to reduce the unavoidable cooling of the first wax that always happens especially with high loads of samples; this phenomenon must be avoided especially when it is requested a short step time for the first wax because an excessive cooling may impede a good drain of it.

Mixing

One or two mixing for each step is normally sufficient to ensure a good reagent movement around the samples. More mixing are advisable for high sample loads. At this regard it is necessary to consider that the SPC floor continuously receives a moderate heating from the WWC ceiling, this heating creates a convection movement that results in a gentle but forced and homogeneous mixing of the reagents.
Furthermore that convection mixing is increased when the SPC heating is set ON.

Example of processing programs

Normal size samples

Step	Reagent	Time (minutes)	TMP	PV	MX
1	Formalin	60	A	A	2
2	Dehyol 95	60	A	V	2
3	Dehyol 95	60	A	V	2
4	Dehyol 95	60	A	V	2
5	Dehyol 100	60	A	V	2
6	Dehyol 100	60	A	V	2
7	Dehyol 100	60	A	V	2
8	Xylene or Bio Clear	60	30	V	2
9	Xylene or Bio Clear	60	40	V	2
10	Xylene or Bio Clear	60	45	V	2
11	Wax 58	60	60	A	2
12	Wax 58	60	60	V	2
13	Wax 58	60	60	V	2
14	Wax 58	60	60	V	2
Total Time (hours:minutes)		14:00			

Biopsies

Step	Reagent	Time (minutes)	TMP	PV	MX
1	Formalin	0	A	A	0
2	Dehyol 95	20	A	V	0
3	Dehyol 95	20	A	V	0
4	Dehyol 95	20	A	V	0
5	Dehyol 100	20	A	V	0
6	Dehyol 100	20	A	V	0
7	Dehyol 100	20	A	V	0
8	Xylene or Bio Clear	20	30	V	0
9	Xylene or Bio Clear	20	40	V	0
10	Xylene or Bio Clear	20	45	V	0
11	Wax 58	20	60	A	0
12	Wax 58	20	60	V	0
13	Wax 58	20	60	V	0
14	Wax 58	20	60	V	0
Total Time (hours:minutes)		4:20			

Difficult samples

Step	Reagent	Time (minutes)	TMP	PV	MX
1	Formalin	60	35	A	3
2	Dehyol 95	90	35	V	3
3	Dehyol 95	60	35	V/P	3
4	Dehyol 95	60	35	V/P	3
5	Dehyol 100	90	35	V	3
6	Dehyol 100	60	35	V/P	3
7	Dehyol 100	60	35	V/P	3
8	Xylene or Bio Clear	90	35	V	3
9	Xylene or Bio Clear	60	40	V/P	3
10	Xylene or Bio Clear	60	45	V/P	3
11	Wax 58	90	60	A	3
12	Wax 58	60	60	V	3
13	Wax 58	60	60	V/P	3
14	Wax 58	60	60	V/P	3
Total Time (hours:minutes)		16:00			

Short time process (small samples)

The VTP300 can perform short step time processes. Reduced step times can be adopted for biopsies or small size samples. The user will have to determine the best step timing basing his choices on past experiences and also taking care of what follow:

1) The efficiency of a vacuum tissue processor (like the VTP300) is superior to that of a traditional “carousel” tissue processor.
2) The shorter are the step time the more is important the overall quality of the reagents and their correct maintenance.
3) The time indicated for each step program is inclusive of the fill and drain times, normally:
   - 1’15” for the filling.
   - 2’30” for the drain for processing programs with a total time > 5 hours.
   - 1’15” for the drain for processing programs with a total time < 5 hours.
4) For the correct infiltration of small samples it is not strictly necessary the use of 4 waxes, 3 would be sufficient, it is advisable to jump the second wax.
5) The minimum step time is 5 minutes. **We recommend to not set short times in the first wax. The minimum time for it must not be shorter than 20 minutes**. That is due (as already explained above) to the contact of the first wax with samples and baskets that are still quite cold. In the following wax steps this problem doesn’t exist anymore. If the VTP300 is asked to drain the first wax after only a few minutes from the fill it may happen that the drain is not complete due to the formation of cold and solidified wax spots especially in the core of the SPC. It may also happen that one of the cold solidified wax spots will clog the draining holes in the bottom of the SPC resulting in incomplete drain alarms. This problem (which is more or less common to any and each kind or brand of tissue processors) is more probable with a full samples load, with a low samples load (for example 50 biopsies) the problem doesn’t practically exist, any case it does not make any sense (and it doesn’t bring any benefit to the process) to set step times shorter than 10 minutes. A good timing choice for the first wax is a minimum of 1 minute every 10 samples (thus 20 minutes for 200 samples and 30 minutes for 300).
6) For the reasons described at point 5 the first wax is not subject to cycles of vacuum (even when vacuum is set in the program), that is due to the possible formation, with high samples load, of a sort of solidified foam on top of the sample baskets that will require long time for its melting.
7) The two phenomenons above described are more or less common to every kind and brand of tissue processor. That is easily understandable by the fact that, as said, the first wax gets in contact with quite cold samples baskets and SPC walls. The problem can be reduced if in the last reagent the temperature is set at 45°C. In case of drain alarms in the first wax the most useful and efficient remedy is the first wax step time increasing. Another sign of this problem can be the systematic decrease of the level of the first wax bottle together with the increase of the level in the second wax bottle.

Fixation

The overall samples fixation is normally done outside the tissue processors. That is due also to the need to perform different fixation type and timing in relationship to the kind and size of sample.
The first step in formalin is not necessary if the fixation has been completely executed outside the tissue processor. It can be useful to remember that the formalin can leave solid crystals that may be detrimental for some of the internal parts of the tissue processor (and again this is worth for every kind and brand of tissue processor). Thus we recommend what follow:

- ❑ Perform a complete fixation outside the tissue processor.
- ❑ Wash the samples in fresh tap water before to introduce them in the tissue processor.
- ❑ Set for the first step a low gradation alcohol or water.
- ❑ In case the fixation is completed in the tissue processor, set a bottle of water in the following station (that is worth especially for week-end processes).

Alcohols dilution

More or less in every kind and brand of tissue processor the alcohols are subject to a forced dilution due to the water released by the samples (that is the work done by the alcohols: water removals from the samples or dehydration). This unavoidable dilution is exploited in the RMS by Group to avoid the need to dilute the alcohol before their loading in the bottles.

In the processing program examples previously shown only 95% and 100% alcohols are used implying that:

- The tissue processor would be used with the RMS activated.
- Only at the very first alcohols loading the first three would be manually diluted in order to create a gradual increase of the alcohol concentration (for example 50 – 80 – 95), theoretically only once in the life of the tissue processor, practically every time for any reason it would be necessary to substitute all the reagents and reset the RMS.
- Please note that what suggested in point 3 is advisable but not strictly necessary because in several laboratories where the VTP300 is installed are used 95% and 100% alcohols without ever performing any dilution and with very good processing results.

Graphs of the last 30 processes executed

At the end of the process it is advisable to look at the graph of the last executed process in order to check if it was performed flawlessly. We recall that to access the graph is it simply necessary to press the key GPH in the Main Menu screen, the graph firstly shown is always the one of the last executed process.

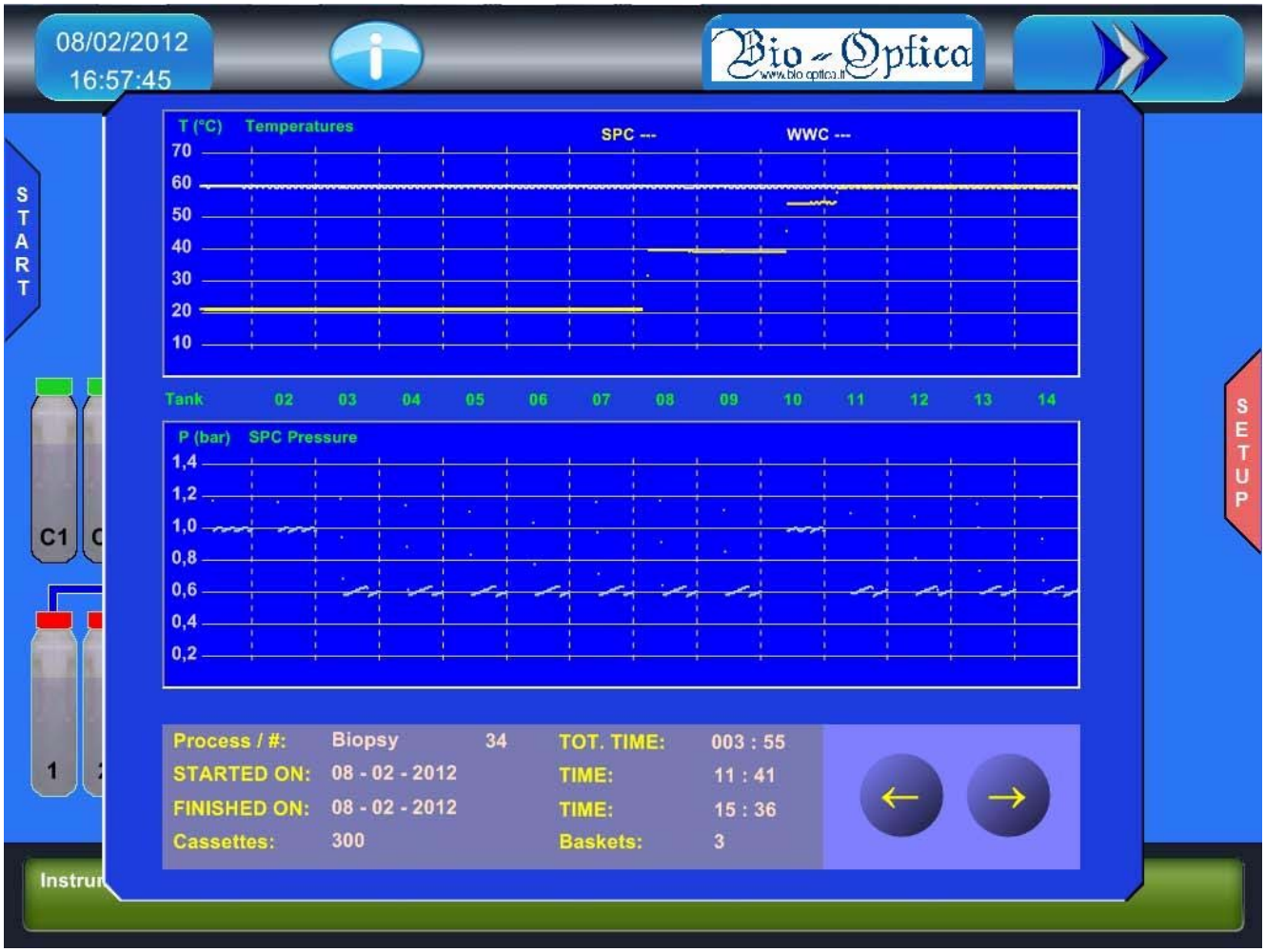
The graph visualizes for each step what follow:
- The temperature of the SPC.
- The temperature of the WWC.
- The pressure of the SPC.
- Any occurred alarm or alert.
- The program steps.

There are two windows:
- The upper one is reserved to the temperatures and the alarms.
- The lower one is reserved to the SPC pressure.

In the event of an alert/alarm their visualization is made by a small box with the alert/alarm number inside it, an arrow that points into the graph indicated the exact time in which the alarm occurred. All of it, together with the alarm archive (in the service menu), may be of great help on determining what really happened in case of a faulty event during the process. The graphs, other than to be helpful in case of an alarm, may also allow the avoidance of a future faulty event.

For example: a not sufficiently stable temperature or pressure graph may indicate a degradation of the temperature control system or the air pump performances. In this case it will be possible to call our technical service for a preventive maintenance and avoid possible future alarms and the risks of not complete processes. Please see in the following pages some graph examples.

"Example 1: process successfully executed"



Alerts and Alarms

Managing alarms

There are two types of alarms:

Alarms 1 through 50 are NOT-BLOCKING ALERTS.
NOT-BLOCKING alerts are only WARNINGS and do not interrupt the program execution because the cause of them is not critical for the process completion. In this situation, a program stoppage may produce worsen results than its continuation.
When an ALERT occurs, the program continues and the screen displays the alert number and a brief explanation of it. Upon the process program completion, the cause of the alert can be determined and usually easily eliminated by the operator.
Procedures listed below for each type of alert/alarm should be followed to correct the cause of the problem. If the problem persists, a call to our service department may be indispensable.

Alarms 51 through 99 are BLOCKING ALARMS.
These are true alarms, and the process cannot continue as the cause of the alarm makes it impossible to proceed.
In the event of a BLOCKING alarm, follow the instructions displayed on the screen to:
1) Stop the acoustic alarm.
2) Try to empty the SPC from wax/reagent.
3) Remove the samples.
4) Reset the instrument.

After the reset, the instrument is again ready to run a program. The alarm could simply have been an error in closing the chamber lid or something else easy to resolve. Before to proceed please do what follow:
1) Remove all samples.
2) Check that the SPC does not contain any reagent residuals.
3) Check reagent and wax bottle levels.
4) Check that the bottles are correctly placed in their housing slots.
5) Check that the waxes are melted and, if possible, verify their temperature.
6) Check and clean the SPC lid gasket.
7) Start a purge to verify the correct functioning of the instrument.

When the cause of the alarm is unknown or uncertain, it could be helpful to check the voltage and the quality of the main power line. If the alarm persists, please call our technical assistance.

Procedure for the instrument reset

In the top left of the instrument rear panel there is a green o red button. Its purpose is the complete reset of the instrument software program. It must be used under the following circumstances:

- When, for any reason, the user is unable to reset an alarm in the usual way.
- When a user faces unexpected situations that cannot be resolved by any other means.
- To reset the instrument's memory that holds variables pertaining to the state and contents of the SPC, possible processes in progress, possible actions in progress and/or alarms in progress.

The procedure for using the reset button is the following:
✓ Switch off the instrument (the switch is located near the main power cord).

- ✓ Press and Hold the reset button.
- ✓ Switch on the instrument and maintain the reset button pressed until the Main Menu screen appears.

After this operation the VTP300 may be ready for operations again, but before to start any kind of process it is necessary to verify:

- ➢ That the SPC is empty.
- ➢ That the SPC is clean (above all in reference to the presence of paraffin residue).
- ➢ That the lid gasket of the SPC is clean and in its correct position.
- ➢ That the instrument works correctly, by performing tests from the service menu.
- ➢ That an alarm present before the reset is not again on the display, in this case will be necessary to switch off the instrument and call our service department, (with the exception of the alert #1).
- ➢ Before to start the purge cycle execute the instrument check list.
- ➢ Run a purge cycle to verify that the instrument is fully operative.

In the next paragraphs, each alert/alarm and the appropriate solution is described.

Graph of the last 30 processes

In case of an alarm it can be useful to consult the graphs of the last 30 processes executed to verify if there is information that may allow to better understanding why an alarm was issued.
See also the preceding chapters for more information on the graphs.
The alarms numbers are shown inside a small box and an arrow points to the graph to indicate the exact moment of the happening. Checking also the alarm archive the chances to understand why an alarm occurred are greatly increased. For example:

- ❑ If the wax temperature graph is unstable (more than +/- 1.0°C) or if the temperature shown is different from the pre-defined setpoint, it is possible to suspect a failure of the wax temperature control system. These temperature problems may also cause drain or fill alarms.
- ❑ Analogous situation may happen with the SPC temperature.
- ❑ The pressure graph allows the control of the air pump efficiency and the good sealing of the pneumatic circuitry. In case of leaks the graph will be not stable to indicate an excessive frequency of the air pump start to restore the requested pressure into the SPC.
- ❑ A blocking alarm may be foregone by one or more alerts; in the processing screen it is shown only the last alert/alarm occurred in each step, in the graph all the alerts/alarms are shown even when happened in the same step. That can be useful to understand what really caused the final blocking alarm.
- ❑ From the graph it is also very easy to verify if one or more steps has been jumped and the reason why it happened.

ALERTS (NOT-BLOCKING)

1 - PW FAILURE

EXPLANATION – the alert #1 indicates that there has been an interruption of power. It may be due to a loss of power in the main line or merely due to the switching OFF of the instrument. If the loss of power occurs during a process, the VTP300 automatic power outage protection will allow it to resume the process program exactly from where it was interrupted. The program resume will be performed according to the formula:
Steps 1 to 10 (formalin, alcohol, xylene, etc): no special action, the power failure time is considered processing time and the VTP300 continues as if nothing happened.
Steps 11 - 12 (wax): processing will pause (for approximately as much time as the unit was without power) waiting for the processing and the wax chambers to return to the proper temperature. The power failure time and the related re-heating time are NOT considered processing time.
CAUSES – Loss of power in the lab, a blown fuse, or the simple switching OFF of the unit.

SOLUTION – If the power supply doesn't resume, check the electric network, plug and cord. If necessary, replace the instrument fuses. If the instrument is found fully operational but this alert appears too frequently (e.g. more than once in a month), it would be prudent to have the unit connected to its own power supply (separate circuit and breaker). To increase the instrument safety and reliability, an uninterruptible power supplies (UPS) may be used to protect against power failures, fluctuations and spikes.

2 - DIFFICULT DRAIN

EXPLANATION – difficult during the reagent drain. The instrument had to perform two times the drain.
CAUSE - Insufficient draining speed probably due to partial clogging somewhere in the hydraulic circuit.
SOLUTION - Verify the SPC draining holes, verify the bottle contents, the presence of solid residue can slow down the draining.

3 - SHORT DRAIN

EXPLANATION – the duration of the reagent drain was too short.
CAUSE - Insufficient level of reagent in the indicated bottle.
SOLUTION - Verify reagent levels.

4 - P/V TIMEOUT

EXPLANATION – the instrument is not able to create the proper vacuum in the processing chamber at the scheduled time. The processor will not try anymore to create vacuum in that step and will go on with the program. During the next step, if scheduled, it will try again.
CAUSE – not perfect sealing of the lid gasket.
SOLUTION – check and clean the lid gasket.

5 - FULL FILL P

EXPLANATION – excessive level of reagent in the bottle during the fill; the overfill is recognized and the filling is stopped before it can produce a failure. The process can continue without problems.
CAUSE - Excessive level of reagent in the bottle.
SOLUTION - Verify reagent levels.

6 - ABORTED STEP

EXPLANATION – it is impossible to fill the content of a bottle into the SPC. The bottle will be jumped and the following bottle in the process list will be used, the time of the aborted step will be added to the current one. If the attempt succeeds the process can continue without problems. In case also the following bottle cannot be filled the process is interrupted and the instrument indicates alarm 53 – LINE CLOGGED.
CAUSE - full clogging somewhere in the part of the hydraulic circuit of the jumped bottle.
SOLUTION - Verify where possible the bottle pipeline.

7 - FILE NOT FOUND

EXPLANATION – file not found or corrupted in the long term computer memory; the systems recovery replaces the lost or incomplete file from a backup copy.
CAUSE – transitory malfunction of the CPU memory.
SOLUTION - No intervention by the user is possible. If the problem persists, contact our technical service.

8 - LONG DRAIN

EXPLANATION – the time required to drain the SPC was excessive.
CAUSE - Insufficient pressure in the SPC due to: not fully efficient air pump, an air leak in the pneumatic circuit or an air leak from the SPC lid gasket.
SOLUTION - Check the SPC lid gasket, contact our service department for other causes.

9 - WWC TEMP LOW

EXPLANATION – during the process before the first wax step, the temperature of the wax chamber dropped

down to a level not sufficient to guarantee the wax melting; the process continues till the last reagent. If the problem persists, before the draining of the last reagent, the process is stopped (see alarm 60).
CAUSE - The thermo-regulation system of the wax chamber is out of order.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

10 - PNV TIMEOUT

EXPLANATION – the PNV (Pressure Normalize Valve) is the solenoid valve that provide to normalize the pressure inside the SPC (making it the same of the ambient pressure), if the pressure doesn't normalize within 3 minutes from the intervention of the PNV this alert is issued.
CAUSE – Possible malfunction of: PNV, IOB, wiring. Possible clogging of pipeline between SPC and PNV.
SOLUTION – Check, and in case clean, the small hole in the right wall of the SPC. A small quantity of Xylene (or xylene substitute) can be introduced into the hole with a syringe, if the clogging was due to a small drop of solidified wax after a few minutes the xylene may melt it, try also to heat the SPC from the Service menu, after 15 minutes or more try to execute the Pressure test from the service menu, after the creation of the pressure press ENTER to release the it, if the pressure normalizes the problem has been solved. If the problem persists, contact our service department for technical assistance.

11 - M1 FAILURE

EXPLANATION – M1 is the name of the motor that provides the clockwise rotation of the VR (Rotary Valve). If the position of the VR doesn't change within 10 seconds from the starting of the clockwise command this alert is issued. This is not a blocking event because the instrument may continue to work by using the counter-clockwise motor (M2).
CAUSE – Possible malfunction of: M1, wiring, IOB.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

12 - M2 FAILURE

EXPLANATION – M2 is the name of the motor that provides the counter-clockwise rotation of the VR (Rotary Valve). If the position of the VR doesn't change within 10 seconds from the starting of the counter-clockwise command this alert is issued. This is not a blocking event because the instrument may continue to work by using the clockwise motor (M1).
CAUSE – Possible malfunction of: M2, wiring, IOB.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

13 - VR MSW FAILURE

EXPLANATION – The micro-switch of the VR is not working properly. It is not sufficient to stop the operation of the instrument. The VR continues to work but one of the control functions of the VR is not available.
CAUSE – Possible malfunction of: VR micro-switch, wiring.
SOLUTION - No intervention by the user is possible. If the problem persists, contact our service department for technical assistance, meanwhile it is possible to successfully and safely use the VTP300.

14 - SPC TEMP LOW

EXPLANATION – during the process the temperature of the sample processing chamber did not reach the setpoint; the process continues till the "last reagent before the waxes". If the problem persists, before the draining of the "last reagent before the waxes", the process is stopped (see alarm 60).
CAUSE - The thermo-regulation system of the SPC is out of order, or step time too short to allow the reagent to be heated at the desired setpoint (when the EHE is not used).
SOLUTION – If the problem is due to a mistaken programming: change the step time or temperature. If the problem is due to a fault on the SPC thermoregulation system no intervention by the user is possible. If the problem persists, contact our service department for technical assistance.

15 - SHORT FILL

EXPLANATION – during the reagent fill the filling time was too short, the reagent level may be insufficient to

cover the samples.
CAUSE – Malfunctioning of the pneumatic system, reagent level in the tank too low.
SOLUTION – Verify the reagent level in the tank(s). If the problem persists, contact our service department for technical assistance.

20 - PROC SUSP USER

EXPLANATION – The process has been suspended for the opening of the SPC lid or by user request.
CAUSE – When the SPC lid is opened during a process, or the user suspend it by pressing ESC and ENTER, the computer temporarily halt the process execution. When the SPC lid is closed back the computer automatically resume the process execution within 3 minutes from the opening. The user can also manually resume the process, if the lid is closed, by pressing the key ENTER.
SOLUTION – Close the SPC lid as soon as possible. If the process is not resumed wait for the system to automatically check the SPC lid micro-switch functionality (that it will happen within 3 minutes from the lid closing). If the micro-switch will be found broken the system will automatically disable it and it will resume the process execution. (Of course, meanwhile, the SPC lid must be left closed).
If the SPC lid is closed but the system shows that it is open, the micro-switch that controls the SPC lid status is surely broken or out-of-position. Waiting for service it is possible to manually disable it by the instrument SETUP menu.

21 - PROC SUSP LID

EXPLANATION – The process has been suspended indefinitely cause the opening of the SPC lid.
CAUSE – in case of process suspension the process MUST be resumed within 3 minutes, after that time the suspension is considered accidental and this ALERT is issued to not confuse it with alert 20.
SOLUTION – see ALERT 20.

22 - PROC SUSP UPS

EXPLANATION – This alert is issued only in unit with the RS-232 connected UPS.
CAUSE – The process has been suspended because, during a power failure, the UPS batteries went below 40% charge. The process is suspended to avoid that the energy would be completely lost during a drain or fill action with the risk that the sample will remain in air. The instrument is set in a condition of power saving to increase the UPS batteries life.
SOLUTION – Restore the electrical power, if the power is restored before the batteries would be completely exhausted the process will be automatically restarted. Any case the process will be restarted after the power is restored, even in case of total loss of batteries charge, but in case of wax steps a delay is introduced to ensure the wax complete melting. If the electrical power is not restored within 5 minutes from the issuing of this alert, the condition is switched to alert 23 and the instrument prepare itself for the complete switching OFF (see alert 23).

23 - PROC SUSP INDEF

EXPLANATION – The process has been indefinitely suspended due to the extended opening of SPC lid or lack of power when the instrument is equipped with the UPS and the batteries are too low (see alert 22).
CAUSE – In case of suspension (see alert 20 and 21) the process must be restored within 3 minutes, over that limit the suspension is considered unwanted or accidental and this alert is issued to not mistakenly confuse the situation with the temporary suspension. A beeping starts to signal the potentially faulty situation to the users. This alert is also issued on instruments equipped with UPS when there is a power failure and the batteries charge is not sufficient to keep the instrument alive, the process has been suspended and the instrument prepare itself to the complete power failure.
SOLUTION – see alerts 20, 21 and 22.

30 - RMS POSTPONED

EXPLANATION – The RMS (Reagent Management System) is an automatic feature that periodically requests the user the substitution of certain reagents in relationship to pre-determined plans. The user may decide to

postpone the execution of an RMS request, but in this case an alert is issued and stored in the memory for future consultation. If the RMS is postponed only once nothing bad can happen to the processing quality, but in case of more than once postponing events the quality of the reagents may go under an acceptable level.
CAUSE – The RMS execution has been postponed by the user.
SOLUTION – Execute the RMS every time is requested by the system.

32 - RMS POSTPON PW

EXPLANATION – The RMS has been postponed due to lack of knowledge of the password. See also Alert 30.
CAUSE – See alert 30.
SOLUTION – See alert 30.

34 - WRONG PASSWORD

EXPLANATION – The password has been mistakenly typed more than three times. The alert is stored in memory for future consultation.
CAUSE – See alert 30.
SOLUTION – Type the correct password; if the password is lost please call our technical service to retrieve it.

40 - ELODEV LACK

EXPLANATION – The drivers of the touch screen device are not responding properly.
CAUSE – Hardware failure of the touch screen devices.
SOLUTION – If the problem persists, contact our service department for technical assistance, **meanwhile it is possible to successfully and safely use the VTP300 by connecting an AT keyboard in the rear panel (see sub-chapter "Rear panel") All instrument functions can be controlled also by a common PC keyboard.**

ALARMS (BLOCKING)

51 - FILL NO VACUUM

EXPLANATION – The instrument was unable to produce vacuum in the process chamber while attempting to fill from a reagent or a wax station.
CAUSE – During the filling stage, a leak in the pneumatic or hydraulic circuit occurred; the air pump is not fully efficient or broken.
SOLUTION – Check the SPC lid gasket. Please contact our service department for assistance.

52 - FILL TIME OUT

EXPLANATION – The filling from a reagent or a wax bottle has not occurred in the allotted time.
CAUSE – See alarm 51.
SOLUTION – See alarm 51.

53 - LINE CLOGGED

EXPLANATION – Before to fill the content of a tank the system tests the tank specific portion of pipeline. If the pipeline is clogged the system tries to fill the following reagent and issues the alert 6 ABORTED STEP, in case also the following bottle would be clogged the system will issue this blocking alarm and will stop the process.
CAUSE – The pipeline of the bottle that the system is going to fill is clogged, or the previous reagent was not completely drained due to the pipeline obstruction or due to some problem in the hydraulic or pneumatic circuit.
SOLUTION – Check the specific portion of pipeline of the tank involved in this alarm (or the previous tank), there may be debris (or drops of solidified wax) that clogs it.

54 - SPC OVERTEMP

EXPLANATION – During a wax step the processing chamber temperature went over the allowed limit (not to be confused with alarm #20).
CAUSE – SPC thermoregulating system damage.
SOLUTION – No intervention by the user is possible. Please contact our service department for assistance.

55 - TS SPC OUT

EXPLANATION – Malfunction of the SPC temperature sensor.
CAUSE – SPC temperature sensor failure.
SOLUTION – No intervention by the user is possible. Please contact our service department for assistance.

56 - SHORT FILL

EXPLANATION – A reagent fill was completed before the minimum allotted time. The SPC will be drained and the process will proceed to the next step. If the problem persists, the process will be stopped.
CAUSE – Very low quantity of reagent in a bottle; reagent bottle quick connector not fully inserted into the female receptacle.
SOLUTION – Check reagent bottle position and fluid levels. If the problem persists, contact our service department for technical assistance.

57 - VR OUT

EXPLANATION – The rotary valve is out of position.
CAUSE - The Rotary Valve motor failed or the Rotary Valve position sensor failed.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

58 - FILE NOT FOUND

EXPLANATION – An essential computer file is damaged or cannot be found and the error recovery system couldn't correct the problem.
CAUSE – Computer malfunction.

SOLUTION – No intervention by the user is possible. Please contact our service department for assistance.

59 - SPC TEMP LOW

EXPLANATION - The SPC chamber temperature was too low during the drain of a wax step, the drain cannot be completed. The process will be stopped to avoid other problems.
The samples will be left in wax till the user intervention.
CAUSE – Incorrect working of SPC: temperature sensor, heater, safety thermostat.
SOLUTION – No intervention by the user is possible. Please contact our service department for assistance.

60 - WWC TEMP LOW

EXPLANATION – At the moment of the fill of a wax step, the temperature of the WWC chamber was too low. The process will be halted because the fill cannot be guaranteed.
CAUSE - Incorrect working of WWC: temperature sensor, heater, safety thermostat.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

61 - WWC OVERTEMP

EXPLANATION – The temperature of the wax chamber is well above the set point.
CAUSE – WWC temperature system failure.
SOLUTION – No intervention by the user is possible. Please contact our service department for assistance.

62 - TS WWC OUT

EXPLANATION – The WWC temperature sensor is out of the correct range.
CAUSE – WWC temperature sensor failure.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

63 - PRESSURE NR

EXPLANATION – During the ending phases of the drain the pressure in the SPC is too low.
CAUSE - The air pump or other pneumatic circuit parts failed.
SOLUTION - No intervention by the user is possible. Please contact our service department for assistance.

64 - DRAIN NO PRESS

EXPLANATION – During the drain the pressure has not reached the correct value.
CAUSE - see alarm 63.
SOLUTION - see alarm 63.

65 - DRAIN TIME OUT

EXPLANATION - The drain has gone over the maximum time allowed.
CAUSE - see alarm 63.
SOLUTION - see alarm 63.

66 - SPC NOT EMPTY

EXPLANATION – The user attempted to begin a process with the SPC either not empty or not cleaned from wax residue.
CAUSE – The SPC is not empty. The purge cycle, compulsory after a process which involved waxes, was not performed.
SOLUTION – If the SPC is not empty, drain it manually. Enter the Service Menu and perform “alarm reset” and “flag reset”. Return to the Main Menu and start the purge.

67 - OVER FILL P

EXPLANATION – An overfill of reagent or wax has occurred in the SPC. (Alarm sensed by overpressure during fill). Normally an event of overfill is intercepted and solved by the anti-overfill devices of the VTP300, in this case a simple alert is shown. If the anti-overfill devices fail to correct the problem this blocking alarm is called and the

process is stopped.
CAUSE – Complete emptying of the previous reagent failed due to an incorrect solenoid valve opening or, in case of paraffin, temperature problems.
SOLUTION – No intervention by the user is possible. If the problem persists, contact our technical assistance.

70 → 89 - COM ERRORS

EXPLANATION – Problems with the serial lines of communication.
CAUSE – Hardware failure.
SOLUTION – Try to switch OFF and ON the instrument. If the problem persists, contact our technical assistance.

90 → 93 - I/O ALARMS

EXPLANATION – Problems with the I/O systems.
CAUSE – Hardware failure.
SOLUTION – Try to switch OFF and ON the instrument. If the problem persists, contact our technical assistance.

Alarms historical archive

The alarms historical archive is under the "SERVICE" menu and consists of a list of the last 100 alarm occurrences. Thanks to this feature, a service technician can immediately recognize the problem, its frequency, the step in which it occurred and other information useful to solve the problem. Alarms are displayed from top to bottom on the screen, starting with the most recent one. Use DOWN arrow to display older alarms. Use ESC to go back to "SERVICE" menu.
If a printer is available the alarm list can be printed from the "SETUP" menu.

Service (first-aid instrument assistance)

With the service functions, the following tests can be performed:

Touch S. Calibr.

This function is used to calibrate the TOUCH SCREEN position in respect to the LCD screen. After the activation of this function it is necessary to carefully follow the procedure indicated in the screen. At the end of the calibration the system will automatically restart.
CAUTION: in case of errors during the calibration the Touch Screen may not be working properly, in this case it is possible to reset the calibration to his previous values by pressing the reset button (placed in the back of the instrument) for 12 seconds. The reset operation must be executed from the Main Menu or from the Service Menu, if none of these menus is visible, it is necessary to switch the instrument OFF, after 10 seconds switch it ON again keeping the reset button pressed until the Main Menu appears.

Drain SPC

This function is used to empty the SPC in case for any reason (for example a blocking alarm during a process) reagent residues are still present into it. Before to use this function it is important to remove the causes that create the alarm (for example by substituting the SPC lid gasket if the alarm was vacuum/pressure related).

Activating this function firstly the processor checks the status of the rotary valve and the “SPC last” and “SCP cont.” flags. In case of inconsistency between the flags and the rotary valve position, or in case the position of the rotary valve is unknown (POS value = to 99), the processor will require the operator to decide in which bottle drain the SPC content. In this case it is solely responsibility of the operator to choose the right bottle (an empty bottle or a bottle with a residue volume sufficient to contain the SPC content). Pressing ENTER the processor will perform a normal drain procedure; in case of blocking alarms the procedure will be stopped. Caution: do not use this function in case of not melted wax would be present in the SPC. In this case it is necessary to first melt the wax with the service function “SPC HEATING”. When the wax is completely melted the drain procedure can be started but being certain to choose a rotary valve position from 11 to 14.

For safety reasons, if case of presence of reagent, the SPC lid must remain closed all time.

Vacuum test

The instrument will create vacuum in the SPC; this test must be done with the SPC empty and clean. The SPC must reach a pressure of 600 HPa (see Pressure field) within 35 seconds (see Timer field).
If the time exceeds 35 seconds, the SPC lid gasket must be checked and cleaned. If this action does not correct the problem, contact our service department for technical service.

Pressure test

The instrument will create pressure in the SPC; this test must be done with the SPC empty and clean. The SPC must reach a pressure of 1200 HPa (see Pressure field) in a maximum time of 15 seconds (see Timer field) If the time exceed 15 seconds, the SPC lid gasket must be checked and cleaned. If this action does not correct the problem, contact our service department for technical service.

Full Testing

This function allows the execution of the instrument full testing, it is better to execute it with a paper printer connected, in this way a full report is printed. Without the printer the test is still useful because in case of malfunctions the relative alarm is shown at screen but it is not possible to have a full report with the values of the most important parameters (for example: the time required to reach the full vacuum or pressure) .

SPC Heating

This test allows to:
- Check the SPC heating elements.
- Melt the wax residuals that could remain in the SPC in case of an alarm.
- The processing chamber temperature is automatically brought to 60°C.

This process may require up to 30 minutes.

Alarms File

This function displays the last 100 alert/alarm. From left to right are shown: date, time, alarm, step in which the alarm was issued. Only 18 alarms at time are shown starting from the more recent. With the key DOWN it is possible to show the remaining.

Data Backup

With this function it is possible to save on a USB memory all instrument data files, later, in case of need, the saved files can be restored into the instrument memory. The restore operation can be performed only by the service technicians. Before to start this function it is necessary to insert in the USB port a blank, formatted, memory. From this function it is possible to either copy into the USB memory:

- Only the files with extension .dat (data files) contained in the internal memory.
- All files contained in the internal memory.

For reasons related to the program files safety this two operations differ as follow:

- By simply activating this function the computer will copy only the files with the extension .dat (data files).
- By activating this function and keeping pressed the reset button (located in the rear panel) the computer will copy all files.

Be careful during these operations! If the USB memory is not empty, the space can be insufficient to backup all files! Always use blank and formatted USB memories.

Reset flag

This function has the same effect of the Reset Button on the rear panel of the instrument.

Alarms reset

This function may be used to eliminate an alarm appeared during the instrument testing. It can also be used to reset an alarm that for any reason was not possible to reset by the normal way.

Service Menu abbreviation list

POS	VR position
TANK	VR position required
MinA2, MaxA2, Analog2, Range, Centre P1, VR Micro	Data reserved to service technicians
Pressure	SPC direct pressure in Hpa (Hecto Pascal)
Timer	Time necessary to make vacuum and pressure in the SPC
Hold	Elapsed time between two pump starts during vacuum/pressure tests
ALARM	Current alarm code
SPC cont.	SPC content: after a fill it is set to the bottle number filled, after a successful drain is set to zero.
SPC last	Last reagent filled in the SPC (bottle number), after a successful purge it is set to 0.
SETP. SPC	SPC temperature setpoint
TEMP SPC	SPC temperature
T MAX SPC	SPC maximum temperature reached since the last reset
SETP. WWC	WWC temperature setpoint
TEMP WWC	WWC temperature
T MAX WWC	WWC maximum temperature reached since the last reset

Service assistance

Before calling our technical service, please collect the following information:
- Type of instrument.
- Serial number.
- Software release.
- The number of any alarm that has occurred.

Please provide this information to technical service upon contact.

Safety devices

Protection against over-heating

The thermostat controls include a maximum temperature cut-off switch to prevent overheating of WWC and SPC. These devices do not prevent alarms, but prevent overheating when primary control devices fail.
Do NOT use the instrument when an alarm indicates an abnormal temperature status.
In the event of an overheating, it is advisable to switch off the instrument and disconnect the power cord.

Protection against over-pressures

In the VTP300 there is no danger of excessive pressures. The pressure levels developed in the SPC are small and do not present any hazard. Sometimes a light pressure can be present in the SPC at the end of a process. The lid must be opened with care to avoid the possibility of eye injury by reagent vapours and splashing. Always wear safety glasses when handling reagents.

Fuse replacement

Fuse replacement should be done only by qualified personnel.
Please note: always disconnect the instrument from the main power line!
Never use fuses of a different rating and never try to repair damaged fuses.

The VTP300 is equipped with two line voltage fuses.
Fuses are placed into fuse holders located on the rear panel.
Rating:
100V = 12,5A / 110V = 10A / 125V = 10A
225V = 5A / 240V = 5A / (6.3x32mm) (T)
After the instrument is powered, if a fuse blown again, do not try to substitute it another time!
A possible main electrical failure is undergoing in the instrument.

Call our service department for technical assistance.

Remote Alarm

The socket of the Remote Alarm connector has 3 contacts with the following disposition:
- - No alarm = contacts 1-2 closed, contacts 1-3 open.
- - Alarm active = contacts 1-2 open, contacts 1-3 closed.

For the location of the Remote Alarm connector please refer to the paragraph “The Rear Panel” at the beginning of the manual. There are no electrical signals on the remote alarm contacts. They are isolated from the rest of the instrument and can be used to activate an external device such as an Auto-Dialler to call a pre-selected phone number and relay the message that an alarm occurred.
Rating of the remote alarm connector and its associated electronics:
- Maximum voltage: 48V ac/dc.
- Maximum current: 1A.

Runtime Test

Before the start of a main function (process or purge) the instrument executes a series of test to verify if there are the correct conditions to safely and successfully operate.
If the test fails the requested action is aborted and an alarm is issued.
The tests are referred to:
- The temperatures of all the heated components, those temperatures must be compatible with their correct operational ranges.
- The SPC lid closing, if the lid is open an alarm is issued.
- The correctness of the signals from the pressure transducer.
- The correctness of the signals from the VR position sensor.
- The content of the starting process program, if the program is incomplete or part of the data is lost or inconsistent the process cannot be started.
- Various memory variables to make sure that a process is not started with the SPC not empty or dirty.
- Active alarms: no active alarm can be present at the starting of a process or purge.
- The UPS: if a UPS is present and active, and there is a power failure, even if the instrument is working thanks to the UPS, no process can be started because the UPS autonomy is limited to 30 or 60 minutes depending on the charge status of the batteries.

SPC lid heating

The SPC lid is heated (independently from the SPC and WWC heating) to avoid the building up of condensation underneath the lid when in the SPC is present a warm reagent (the condensation will then fall down when the lid is opened creating an uncomfortable situation for the user).
The efficiency of the heating is sufficient to avoid most of the condensation, only a few drops of reagent may still be present in the peripheral zones of the lid especially when the reagent inside the SPC is warm and the outside (ambient) temperature is particularly low (under 20°C).
The temperature of the inside lower face of the SPC lid may reach 54-60°C, so it can be uncomfortable at the touch but it is not anyhow dangerous. The limited power of the heating element (22W) compared to the mass and size of the lid makes it impossible the creation of dangerous temperatures. Any case a safety thermostat (80°C max) has been added to the heater to prevent any kind of over-temperature.

Instrument maintenance

Daily maintenance

The daily maintenance of the instrument consists of:
- Cleaning the processing chamber.
- Cleaning the processing chamber lid and gasket.
- Checking the level of reagent and wax.
- Checking that reagent and wax bottles are correctly positioned in their slots

Periodical maintenance

The following monthly maintenance is recommended:
- Check the indicator of the Charcoal filter and in case is at 100% replace the filters.
- Check for the presence of residues at the bottom of reagent and wax bottles.
- When replacing reagents, carefully clean their bottles.
- Grease the processing chamber lid gasket with silicone or PTFE grease.
- Grease the bottle insertion o-rings with silicone or PTFE grease.

Charcoal filters replacement

Filter replacement is required approximately every 60 to 120 processes, based upon environmental factors and the use of the WCC. Regardless of usage, the charcoal filters should be changed at least once every six months. Charcoal filters must be replaced with the required frequency as they may release toxic and contaminated vapours into the air when exhausted. Exhausted filter waste is to be handled in accordance with the local regulations.

SPC lid gasket replacement

The processing chamber lid gasket is made of VITON rubber (a DuPont trademark).
It needs to be periodically greased with TEFLON grease.
When replacing it, use a plastic sharp tool (not a metallic one) to extract the gasket.
Before to insert a new gasket, clean carefully the gasket housing slot.
The gasket replacement may be not easy due to the fact that, to keep it in place, its length is purposely longer than the slot in the lid. The length excess must be “distributed” on all slot sides.
The insertion is normally possible, with a little bit of patience, after one or two attempts.

Accessories

Printer

The VTP300 with 4 USB ports in the back panel. To one of those ports any kind of USB printer can be connected, the system should promptly recognize it through plug-and-play functions. If that does not happen please call our technical service, it may be necessary to manually install a software driver.

UPS (Uninterruptible Power Source)

General description

The UPS is an optional. The VTP300 can be powered by an external UPS connected or not connected to the VTP300 by the RS-232, the difference consists in the following:

Connected UPS functions and advantages:
- It can communicate with the VTP300 to manage the situations of power failure.
- It reduces the power consumption in case of power failure.
- It will avoid operations of fill and drain when the batteries charge is low.
- During a power failure it allows the continuation of the processing for a time between 30 and 60 minutes.
- Thanks to the communication it is also possible to always know the situation of the batteries and the correct functioning of the UPS itself.
- It acts as a filter to eliminate noises that can come from the electrical power line.
- It will issue an alert and a resounding warning in case of power failure.

Usually a small UPS doesn't allow the tissue processor to terminate a process in case of prolonged power failure, but considering that most of the power failures are shorter than 15 minutes, it reduces the possibility that a power failure will create a failure on the tissue processor functioning.
The VTP300 is endowed with a system to make it capable to overcome power interruptions, but that system cannot guarantee 100% success. The system consists in a special memory capable to retain its content also when the computer doesn't receive electrical power, in that memory every action of the tissue processor is stored every minute or less, when the power is restored the VTP300 will re-start the process exactly from where it was interrupted. Unfortunately some of the power failures are also characterized by sudden oscillations of the voltage that can overcome the VTP300 electrical protection systems, furthermore some of these events may be characterized by a timing (fast transient) particularly harmful for the computer's memory. It is impossible to foresee how many times a power failure may disrupt the functioning of the VTP300, it depends also on the quality of the electrical power supply, a fast transient (or spike) or a very short interruption (between 0.1 and 0.5 seconds) can be much more harmful than a prolonged interruption.
We highly recommend the installation of a UPS when the main electrical power supply quality is known to be poor and the interruptions are frequent.

Switching the UPS on and off (!)

To switch OFF instruments equipped with a UPS it is not sufficient to turn OFF the main wall switch or disconnect the UPS power cord! The UPS will keep the unit powered also with the power cord removed!

To switch OFF the VTP300 it is necessary to switch OFF the UPS and disconnect the VTP300 from the UPS supply power cord. To switch ON the VTP300 it is necessary to reconnect the main power cord to the UPS and switch ON the UPS.

In case it would be necessary to open the rear panels of the VTP300 to operate on the internal parts we

recommend taking particular attentions to ensure the real power disconnection from the UPS.

The simple switching OFF of the main power wall switch and/or the disconnection of the power cord may not be sufficient to ensure that the VTP300 is not electrically powered!

To ensure that the VTP300 is not electrically powered it is necessary to switch the UPS OFF! Moreover, for total safety, when it is necessary to work on internal parts, after the UPS is switched OFF, we also recommend to disconnect the UPS power cord from the VTP300!

UPS installation and maintenance

For the installation and the maintenance of the optional UPS please carefully read and follow the instructions contained on the UPS manual.

UPS behaviour in case of power failure

Batteries status	Action
Nc	Starting a process or a purge is not allowed independently from the batteries charge status.
Nc	Independently from the batteries charge status, when a process is automatically suspended due to a prolonged power failure, it is not possible to manually restart it (by pressing ENTER on the touch screen as it is possible to do with processes suspended by the user), the process is kept in a suspended modality and the VTP300 is operated in power saving modality until the main power is back.
Nc	To save energy the mixing and other minor actions are suspended since the very beginning of a power failure event.
< 100%	The SPC heating is disabled except when in the SPC are loaded waxes. The lack of heating of the reagents for a limited time doesn't prevent a good quality processing.
< 100%	The temperature of the WWC is temporary reduced by 3 degrees (if the process is far from loading waxes), this temporary reduction significantly increase the UPS autonomy.
< 100%	The creation of pressure and vacuum in the SPC is disabled: the temporary lack of pressure or vacuum is not vital for a good quality processing, but the UPS autonomy is significantly increased.
< 40%	The process is completely suspended until the power is back. No fill/drain actions are performed, in case the suspension happens during a fill/drain the actions are completed to ensure that the samples will not dry in air. The processing timer continues to work, when the power is back, if the step time is expired the following one is loaded.

Nc = batteries charge status not considered in this action.

Please note: as explained in other chapters, to be recognized by the VTP300 computer the UPS must be enabled in the INSTRUMENT SETUP function. In case of malfunctions of the communication system the UPS can be disabled. The communication will be suspended but the UPS will continue to backup the VTP300.
Attempts to enable the UPS when the UPS is not implemented will result unsuccessful.
In case of malfunctions of the UPS electrical power system its disabling from the Instrument SETUP may not be sufficient to allow the VTP300 a correct functioning, in this case it will be necessary to call our technical service to either repair the UPS or physically disconnect it from the VTP300.

Important notes

1) During a power failure if the UPS is used up to the complete batteries discharging (less than 20% of residual charge), all the bar squares would be red and the text will report the word "FAIL", after a short while the UPS will cease to sustain the VTP300 and will automatically shut-down. When the main power is back the VTP300 and UPS will restart automatically but it will take at least one hour before the bar will return to be green. If after a total of 3-4 hours the bar is still not completely green, a battery failure may be present. In this case it is necessary to call our technical service to repair the UPS or substitute the failed battery.
2) As well as described at point 1 when the UPS battery charge is close to zero the UPS autonomously shuts-

off. When the power is back the UPS (and the VTP300) will automatically restart without the need to turn on any switch.

3) The text “FAIL” in the UPS bar may be due to the lack of UPS batteries connection (see previous chapter)
4) For more information please consult also the UPS specific manual attached as external appendix to the present user manual.

Technical specifications

Rating	**100/250V 50/60Hz (not user-adjustable)**
Max power	**1000 W**
Main Fuses	**100V = 12,5A / 110V = 10A / 125V = 10A 225V = 5A / 240V = 5A / (6.3x32mm) (T)**
Weight	**153 Kg (empty)**
Dimension in mm	**H 1300 - W 720 - D 600**
Running ambient temperature	**10° / 35° C**
Storing temperature	**-10° / 50° C**
Relative Humidity	**Max 80% (not condensing)**
IEC1010 classification	**Protective Class 1, Pollution degrees 2 Overvoltage category II - 800V impulse (115V versions) - 1500V impulse (230V versions)**
Max elevation	**2500 above sea level**
Temperature controls precision	**+/- 1°C**
Remote alarm socket and relay	**48V DC/AC, 1A maximum**
Paraffin waxes Tanks/Volume	**4 + reserve / 2.5 L**
Paraffin waxes Melting Time	**Approx. 8 hours**
Paraffin waxes Temperature Range	**52° – 65°C (default 60°)**
Sample Processing capacity	**300 standard cassettes**
SPC working temperature	**From ambient to 65°C**
Pressure range	**400/1200 HPa**
Reagent Tanks/Volume	**10 / 2.5 L**
Tanks for purge agents/Volume	**2 / 2.5 L**
Printer	**Normal paper – optional - connected on serial port**
RMS – Reagent Management System	**For all reagents, purge agents, charcoal filters**
WCC – Wax Cleaning Cycle	**Efficient on site system (no SPC filling)**
Reagent Agitation	**User selectable (from 5’ to 30’ frequency)**
RFD – Remote Fill/Drain	**For reagents and purge agents**
Data backup	**On USB memory**
User interface	**LCD 15” colour monitor with Touch Screen**
Process Programs	**12 (including one for reverse processing)**
Delay	**Up to 14 days, 23 hours, 59 minutes.**
Process End Time management	**For every process program, with auto-memorization**
Purge	**1 – factory optimized**
Charcoal filters	**2 – easy substitution and safe handling**
Password	**User selectable, multilevel**
Power failure device	**In the event of a power failure, the processor restarts the process from the interrupted point.**

Units of measure and abbreviations

WWC	Wax Warm Chamber
SPC	Retort - Sample Processing Chamber
RMS	Reagents Management System
WCC	Wax Cleaning Cycle
RFD	Remote fill and drain system
HPa	Pressure unit of measure
W	Power unit of measure; Watt
A	Current unit of measure; Ampere
V	Voltage unit of measure; Volt

The product features reported in this manual are subject to change without notice.

Appendixes

VTP300 Service manual
Touch Screen Monitor User Manual
UPS User Manual (optional)

Software Versions

The control software of this processor may be subject of modifications that may not result in visible differences from previous versions.

Published by:

BIO-OPTICA MILANO SPA
VIA S. Faustino, 58
20134 MILANO
Tel. + 39 02-2127131
Fax + 39 02-2153000
Web www.bio-optica.it